RUDIMENTS

OF THE

PAINTERS' ART;

OR A

GRAMMAR OF COLOURING,

APPLICABLE TO

OPERATIVE PAINTING,

DECORATIVE ARCHITECTURE,

AND THE ARTS.

WITH COLOURED ILLUSTRATIONS AND PRACTICAL INSTRUCTIONS CONCERNING THE MODES AND MATERIALS OF PAINTING, ETC.

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PREFACE.

Wisdom is the presiding attribute of the Divine Architect, and KNOWLEDGE is the wisdom of man.—"Knowledge," Lord Bacon has told us, is "POWER," which is another of the prime attributes of the Divinity—and the stupendous achievements of knowledge and power, since the time of Bacon, have made absolute the truth of an aphorism which has been repeated to satiety. But there is yet a third superlatively Divine attribute, of infinitely more importance to the progress and well-being of man than either knowledge or power, and that is GOODNESS or *well-doing*; and there remains only for human attainment, the fact that *true knowledge and power are coincident with goodness*, to accomplish the original title of man to the resemblance of his Maker.

It is this fact that renders goodness so essential to the acquirement of skill, for skill is nothing else than *well-doing*, which is again coincident with *well-being*, as goodness is with happiness; and these are the essence [illegible] the end of *good workmanship*, without which human [illegible]

ledge and power are not merely in vain, but pernicious in every art and practice, and alike fatal to the workman and his work.

Every good man and artist has therefore an interest in the conjunction of these prime coessentials of morals and art; the first requisite condition for which is, that *true knowledge* must be made accessible ere *power* can be employed for *good*.

Meritorious therefore is the enterprise of those publishers who supply the world with genuine knowledge in cheap books; and the industrious individual who expends his superfluous earnings in the purchase of knowledge, will have made a step towards power, and put himself in the way of becoming a wiser, an abler, a better, and a happier man; while administering to the good of others.

To such ends may be attributed the zeal with which eminent writers have lent their aid to these enterprises for disseminating knowledge and science, in humble emulation of whom we have in the following work attempted to communicate the elements of an art which dresses and decorates with beauty all the works of nature and man—namely, the art of employing colours with taste and effect, herein applied to architectural painting and decorative [illegible] in which attempt it will not be necessary to enter into the theory of light and colours than may be

expedient to the improvement of practice, and a correct understanding of their principles; or as an alphabet is essential to written language. Without extending enquiry therefore into the details of literature, which often confound more by exuberance than they enlighten by genuine knowledge, we have advanced our elements under no other consideration than their truth and practical utility.

Practice is the acquisition of the hand and eye under the guidance of a right understanding. Skill in execution belongs to practice, assisted by the precepts of experience. Taste and advancement in art are attributable to refinement of sense and understanding, through correct elements and principles, and these it is the chief office of literature and science to supply. By such means theory and practice concur in advancement, and elevate the aspirant in art. It has been our business to record briefly the best theory in our power, and such practical precepts and information as we have drawn from experience; for such is the object and end of this attempt, by which we hope to communicate in small compass much useful information applicable to ordinary and decorative painting, &c., whether employed for preservation or embellishment; with a design also to advance the amateur or workman already acquainted with his tools, and to add such incidental particulars and suggestions as may be useful to the qualified artist. "If you will

Fig. 5

sciences grow," said the great Verulam in his "Advancement of Learning," "you need not be so solicitous for the bodies; apply all your care that the roots [*Rudiments*] may be taken up sound and entire;" and to these we have given our principal attention, avoiding all complication and mystery, neither employing technical terms unnecessarily, nor the cant appellations of labourers, which falsify names and vulgarize art.

RUDIMENTS OF THE PAINTER'S ART

Part I.

THEORY OF COLOURS.

Chapter I.

ELEMENTS OF COLOURS.

1. The elements or natural powers by which colours are produced are the positive and negative principles of Light and Darkness, and these in painting are represented by *white* and *black*, which are thence elementary colours; between the extremes of which exist an infinite gradation of shades or mixtures, which are called *greys*, affording a scale of neutral colours. (*See fig.* 1.)

2. As by the deflection of a *point in space* may be generated all the elementary and complex figures and forms of geometrical and constructive science, so from a like deflection of a *spot in place* may be generated all the elementary and compound hues and colours; the science of which is called Chromatics.

3. Thus a spot of any shade or colour on a ground or medium, lighter or darker than itself, being viewed by a Lensic Prism, will be deflected by the ordinary refraction of light and shade into an orb of three colours. (*See fig.* 2 Fig. 5 Black These three colours are the known *Blue, Red,* and *Y*

which as they are incapable of being produced by composition, and also of being resolved into other colours by analysis, are simple, original, and *primary colours*, elicited by the electrical excitement, or concurrence of the light and shade of the ground and spot.

4. Accordingly, if the ground and spot be varied from light to dark, or from black to white, the same process will afford the same three colours, differing only in the inversion of their arrangement, (*see fig.* 3), being the order of the colours in the celestial phenomenon of the rainbow,—"the triple bow" of the poets,—in which the sun supplies the central spot of light which is deflected or refracted by the rain and atmosphere on the dark screen of the sky.

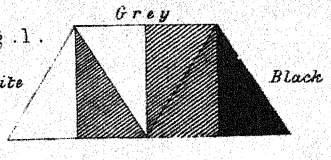
5. This evolution of colours from the positive and negative or polar principles of light and darkness is a simple fact of nature, however the colours may be produced by electrical influence, wherewith it accords that a due reunion of the three colours, or their compounds, will discharge the colours excited and restore the colourless spots and grounds; and in like manner the negative or *neutral* colours may be composed by mixture of the positive material colours, or pigments of the painter. And thus we have educed from nature the first order of colours in the sequence of their relation to black and white. (*See fig.* 4.)

6. In these experimental evolutions of transient colours from light and darkness, a polar influence determines the blue colour, and its allies towards black or darkness as the ...rative pole, and the yellow, followed by red and their ... toward the positive pole of light, or white. And

Fig. 2.

Scale of Neutral Colours.

Fig. 1.



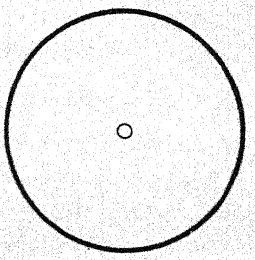
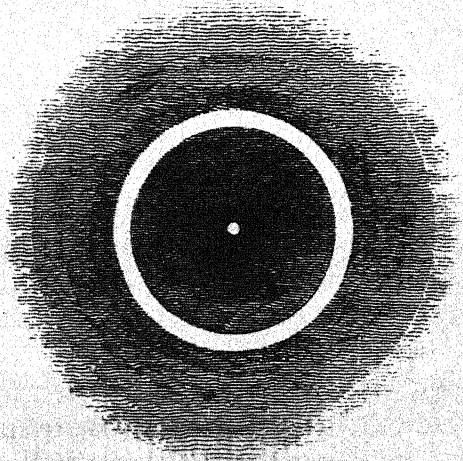


Fig. 3.



Scale of Primary Colours.

Fig. 4.

DEFINITIVE SCALE OF COLOURS.

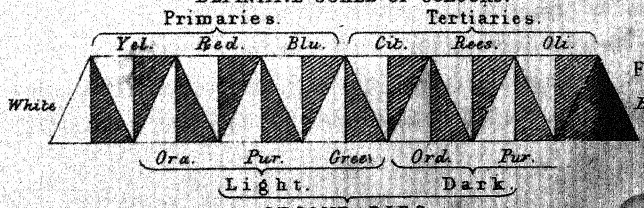


Fig. 5

this is a constant law of chromatism, by which all the relations of colours are determined, as well in respect to vision and the requirements of taste and arrangement as to their physical properties and calorific powers. And it coincides also with the electrical affinities by which colours are determined chemically according to an undoubted universal law.

Chapter II.

THE THREE ORDERS OF COLOURS.

7. By the inverted arrangement of the *primary colours* of *fig.* 2, *in fig.* 3. Red takes the place of Blue, Yellow that of Red, and Blue that of Yellow; and if these pairs of colours cross each other, or be alternately mixed they constitute an order of *secondary colours*: thus if Blue be mixed with Yellow, they will form *Green*; if Yellow be mixed with Red they form *Orange* colour; and if Red be mixed with Blue they form *Purple*; and these second denominations, *Green, Orange, and Purple, constitute the second order of colours.*

8. Finally, in like manner, by the alternate compounding or mixing of these secondary colours in pairs are produced a third order of colours, thence called *tertiary colours*: thus if Green be mixed with Orange colour they will form a *Citrine*, or citron colour; if Orange be mixed with Purple they form *Russet*; and if Purple be mixed with Green they form *Olive* colour; and these new denominations of colours, *Citrine, Russet, and Olive, constitute the third*

order of colours, each of which is variously compounded of the *three* original or primary colours, as the second order are of *two*; the primary order being *single* and uncompounded; and lastly by duly mixing or compounding either of the three orders of colours, *Black* will be produced, terminating the series in *neutrality of colour*.

9. We have thus attained a scale of the three orders of colours, by a regular gradation from White to Black, each colour of which partakes of the positive and negative distinctions of light and dark. (*See fig.* 5.)

10. By the varied and due admixture of these colours are produced the infinity of hues, shades, and tints with which the works of nature are decorated, and which abound in the works of art; and all those individual colours which every season of fashion brings forth under new denominations, but which have been regarded by vulgar uncultivated sense as individually distinct, without order or dependence, the arbitrary inventions of fancy.

11. By an indefinite and disproportionate mixture, however, of the three colours of either order, or of the whole together, will be produced only the hues usually called dirty, or the anomalous colour *Brown*. The browns are nevertheless a valuable class of colours of predominantly warm hues; whence we have *Red and Yellow Browns,* and browns of all hues except *Blue,* which is especially a cold colour affording in like manner the very useful but anomalous class of *Greys,* distinguished from the neutral *Grey,* being also the contrary and contrast of Brown.

12. Our scale may therefore be regarded as an alphabetical guide to the instructed eye and industrious hand,

for imitating and composing with regularity and certainty every variety of *Hue, Shade, Tint,* and expression of colours. So much for the natural and artificial composition and production of colours by mixture.

13. Finally this definitive scale presents the regulation according to which colours should interpose and succeed each other in series, agreeably to the eye in light and shade, with a mellowness that may be compared to the melody of successive notes and cadences in music. And, according to a similar analogy, colours harmonize each other in opposition, as briefly exemplified in the following chapter.

Chapter III.

CONTRASTS AND ACCORDANCES OF COLOURS.

14. It has been shown that colours are primarily elicited analytically from the positive and negative principles or poles of light and shade, represented by White and Black, which are Neutral as colours, and that consequently by a due reunion or composition of the colours thus educed, they are restored to the neutral state of *Black, White, or Grey.*

15. Upon this fact depends all the relations, accordances, contrasts, and harmonies among colours; a subject of much intricacy, boundless extent, and universal interest, as well as of important utility in the arts of decoration, design, and ornament. It is nevertheless simple in principle, as may be rendered apparent by the diagram (*see fig.* 6), in which the three primary colours are placed in interme-

diate relations, and opposed in correlative contrasts to the three secondary colours: Blue to *Orange*; Red to *Green*; and Yellow to *Purple*.

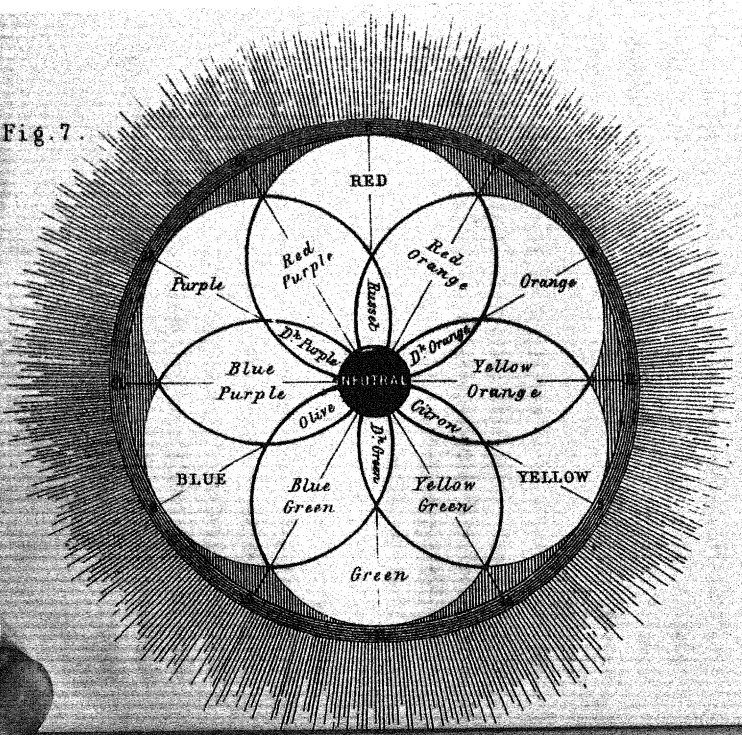
16. The colours of the above scale are numbered according to the proximate relative and opposed powers with which they accord, contrast and harmonize each other in juxta-position or opposition, and neutralize each other in mixture. Their individual effects are also denoted opposite each colour: that of the Blue as *Cold*, the Orange as *hot*, Red as the *extreme*, Green as the *mean* or middle colour, Yellow as *advancing* on the eye with light, and Purple as *retiring* into shade.

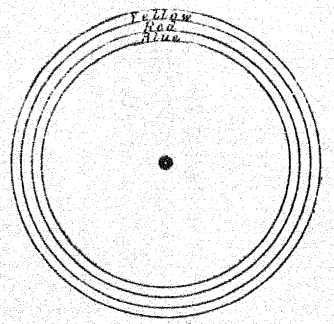
17. Such opposed colours, in adequate proportions, are called complementary from the equivalence with which they neutralize each other; their powers in which respect we have demonstrated to be according to the following Scale of Chromatic Equivalents. (*See fig.* 7.)

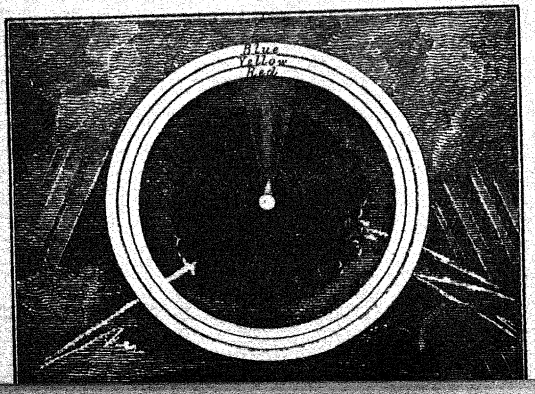
18. In this *Scale of Equivalents* the fundamental powers of the primary colours in compensating and neutralizing, contrasting and harmonizing their opposed secondary colours, are approximately as *three* Yellow, *five* Red, and *eight* Blue; consequently the secondary *Orange*, composed of three Yellow and five Red, is the equivalent of *Blue* the power of which is eight: they are accordingly equal powers in contrast, and compensating in mixture, and as such are properly in equal proportions for harmonizing effect.

19. Again *Green* being composed of Blue the power of which is eight, and Yellow the power of which is three, is equivalent in contrast and mixture as eleven, to *Red* the power of which is five; being nearly as two to one.

Fig. 7.


RED
Red Purple
Red Orange
Orange
Purple
Russet
D^k Purple
D^k Orange
Blue Purple
NEUTRAL
Yellow Orange
Olive
Citron
D^k Green
BLUE
Blue Green
Yellow Green
YELLOW
Green


Yellow
Red
Blue


Blue
Yellow
Red

20. And finally *Purple* composed of Blue as eight, and Red the power of which is five, is equivalent in mixture or contrast as thirteen, to *Yellow* the power of which is three, or nearly as four to one. And such proportions of these opposed colours may be employed in forming agreeable and harmonious contrasts, in colouring and decorative painting, either in pairs of contrasts, or several, or all together; and also for subduing each other in mixture.

21. And further it is apparent that all compound hues of these colours will partake of their compound numbers and contrast each other according to a corresponding compound equivalence. Thus an intermediate Red-purple will contrast a like opposite Green-yellow with the power of eighteen to fourteen, and so on without limit all round the scale; and the triple compounds or tertiary colours of the central star of the Scale are subject to its like regulation as denoted on the graduated margin.

22. There is no invariable necessity, nevertheless, that this regulation of contrasts should be followed strictly according to their numbers in harmonizing colours, although they denote their principal and most powerful effects; for every individual colour has its appropriate expression for which it may be employed predominately as a key; thus affording an infinity of distinct harmonies to fertilize taste and invention, by brilliant and delicate or sober and sombre effects according to the purpose of the Artist or Decorator.

Chapter IV.

ILLUSTRATIONS OF COLOURING.

23. The exercise of taste, and the demands of novelty and fashion, in decoration, and beautifying with colours, has a boundless field of exertion and production in the application of the foregoing principles, wherein the genius and taste of the Colourist has scope as ample for delighting the eye as that of the Musician in the art of harmonizing sounds; and to do justice by examples to these powers in either art would be a vast undertaking, if not a vain attempt. The following illustrations are therefore given, merely as suggestive instances of the effects of the three primary accordances of colours.

24. The first example (*fig.* 8), see page 51, is that of *Blue with Orange*, or of cold and warm colours, which are general equal powers or equivalents, and as such are instanced in nature by the warm sunshine and azure sky. It is in the same relation that Blue is employed effectively with Gold.

25. The second example (*fig.* 10), see page 37, is of the accordance of *Red with Green*; the first of which is the extreme of colour, as the latter is the mean or middle colour, and they harmonize as one to two in power or equivalence, and are remarkable in the roseate blossom with the green foliage throughout vegetal nature.

26. The third example (*fig.* 12), see page 24, is of the remaining general accordance of *Yellow with Purple*, which are complementary nearly as one to four; the first as an advancing or light, the second as a retiring or shade colour; and

they are reciprocally employed by nature in giving effect to Purple and Yellow flowers. The above are leading examples only; but it would be easy, were it expedient, to multiply them to any amount.

27. It is a matter of necessary knowledge to the Artis and of useful information to the Decorator of taste, that *the colours of shadows and shadings are always true contrasts to their lights,* in nature, and affords a rule to harmonious art, the neglect of which is a common cause of failure, and dullness of effect. Hence it may merit attention that rooms, &c., lighted from a cold or northern aspect would be of best effect when having their ornamental designs shaded with warm colours; and that on the contrary, cool shadows are required in rooms of a southern and sunny aspect. The artist, however, who is acquainted with the true relations of light and colours, will be at no loss in adapting his practice to the peculiarity of the case or situation.

28. Not only are there the foregoing harmonies of Succession and Contrast among positive colours, there also is a like contrast of Colour with Neutrality, or of positive Hues with negative Shades. It is hence that coloured back-grounds relieve sculptures, which are white or neutral, agreeably; and that *Blue* does so more effectively than other colours, because sculptures having their own relief, and being powerfully reflective of light, are best contrasted and advanced by that colour which is of nearest affinity with shade, and such is blue. We find accordingly that the Greeks relieved the sculptures of their temples, &c. by Blue back-grounds, which at once harmonized with the sculpture and the sky.

29. So again, in contrasting Black objects with coloured

grounds; such as engravings, neutral drawings or designs, &c., the colour nearest in relation to light, being a warm Yellow, is for the above reason theoretically and practically of best effect. And these will be sufficient to suggest the proper practice in the conduct of Colours and Neutrality in other cases.

30. It is to be observed that the simple principles we have adduced as a guide to the ordinary employment of colours, are but the suggestive elements of a science as boundless as practical geometry, into the intricacy of which the decorator needs not enter, any more than into the subtilities of the latter science; and the mind delighting in such speculations, or emulating the higher accomplishments of art, will find the enquiry extended in our "Chromatics, or the Analogy, Harmony and Philosopy of Colours," and other works.

31. So much then in briefness for the theoretic relations of colours, the knowledge of which is to be regarded as essential to their free and appropriate application in painting; and indispensable for elegance of design in all arts calling for an harmonious and original display of taste, for which some practical hints will appear in our subsequent notes on individual colours and pigments, farther detailed also in our , Chromatography."

32. Fashion it is true governs Operatives and Decorators in their works and designs, but when these artists are well-instructed, and masters in principles they will guide and influence fashion by nature and good taste,—advancing art by purifying it from those barbarous and gaudy obtrusions on chaste design which ever denote art in its infancy or

decline. As to the aids of literature, it can do little more for the artist and artizan than present them with these principles and precepts, the application of which is an affair of their own skill and faculties, in which they have liberty of action but not equality of powers, for these are divine gifts from nature, or the rewards of acquired skill and industry.

33. In the choice, admiration and display of colours, we find crude, natural and uncultivated taste, as in children and savages, delighting in, and employing, entire and primary colours, and harsh, unbroken, or whole notes in their music; but as taste and sober judgment advance, sense becomes more conciliated by broken colours, and half-tones, till, in the end, they refine into the more broken and enharmonic. The same laws still govern them in practice, and the contrasts of which we have given the first crude examples, may still be as strictly employed with colours extremely subdued, and with the utmost refinement of broken tints, and delicacy of expression.

34. Thus colours are no less a science than musical sounds, to which they are every way analogous; and as the musician may be thoroughly acquainted with harmonic science, and able to detect all the errors of the composer and performer of music without being able either to compose or perform of himself,—so also it is with the informed and critical colourist, whether decorative artist, or man of taste; for the excellent works of both arts are the productions of science, conducting genius or natural taste, and a practised hand. To this end our rules are offered as a compass to unrestrained fancy, that, without a guide would run into tasteless extravagance and absurdity.

Part II:

PRACTICAL COLOURING.

Chapter V.

MATERIAL COLOURS.

*35. Having exhibited the sensible principles, relations, and effects of colours sufficiently for general understanding and use in a theoretic view, it is expedient to practice that we briefly advert to their material or physical nature and habits; because upon these depend the durability, fugacity, and changes to which colouring substances and pigments are subject and their works exposed; while it supplies useful experience to the painter and colourist in the practice of their arts.

36. Colours we have distinguished into *Inherent* and *Transient*. Of the first kind are all material colours, more properly called Pigments and dyes; of the second or transient kind are the colours of light and the eye, such as the rainbow, halos, prismic and ocular spectra, &c.; all of which, as before shewn, are formed by the concurrence of the elements of light and darkness, which elements, in the language of the chemists, are oxygen and hydrogen, both of which enter inherently into the matter of solid pigments, and constitute the transient light of our atmosphere and of day. Hence painting, &c., excluded from light and

air in many cases become dark, and in other cases, when exposed to light and air, they bleach and fade, or variously change colour according to their chemical constitutions, as will be further noted of individual pigments.

37. We have employed the terms Oxygen and Hydrogen to denote the more properly *Phatogenic* and *Sciogenic* elements of light and shade, not for their fitness, but because they have been adopted in an analogous elementary signification in chemistry. It would, however, be beside our purpose here to discuss the elementary doctrine of the physical causes of light and colours, having spoken thereof more at large in other works.

38. We proceed, therefore, in the next place, to detail the powers, properties, and preparations of the materials employed in the various practises of painting, among which pigments, or paints, are principal, and respecting which it is to be remarked generally, that the variety of lightness and darkness in colours are called *Shades*; the varieties of gradations in the mixtures of colours are called *Hues*, and the various mixtures of hues and colours with white and shades are called *Tints*. We preface these and other distinctions as necessary to the painter for the better understanding and compounding his materials, with which it is the object of this part of our work to make him acquainted.

Chapter VI.

QUALITIES OF PIGMENTS.

39. The general qualities of good *Pigments*, technically called *Colours*, are: 1, beauty of colour, which includes pureness, brightness, and depth; 2, body; 3, transparency or opacity; 4, working well; 5, keeping their place; 6, drying well; and 7, durability; but few pigments possess all these qualities in equal perfection.

40. *Body*, in opaque and white pigments, is the quality of covering and hiding a ground well; but in transparent pigments it signifies richness of colour, or tinting power; working well depends much on sufficient grinding, or fineness of texture; keeping their places and drying well belong principally to the vehicle, or liquid with which they are tempered, and chiefly on the oil with which they are employed. Of all which and other particulars we shall have occasion to speak elsewhere, and in respect to individual pigments;—as we have more at large in our "Chromatography."

41. All substances are positively or negatively coloured, whence the abundance of natural and artificial pigments and dyes with which the painter and colourist in every art are supplied, and the infinity of others that may be added to them. As, however, it is *durability* that gives value to the beauty and other qualities of colours or pigments, and those of nature being for the most part adapted to temporary or transient purposes, few only are suited to the more lasting intentions of art, and hence a

judicious selection is essential to the practice and purposes of artists.

42. And as the present enquiry is concerning the employment of solid colours in painting, properly called Pigments, it is our express business to form such selections from those in use as are best adapted to the various requirements of painting in oil, in distemper, fresco, &c., and to denote their habits, mixture, and best modes of manipulation of each, and this we purpose in the order of the colours as delivered in the preceding scales.

43. In *mixing colours* the painter should avoid using a greater number of pigments than necessary to afford the tints required, as such mixtures are usually fouler than the colours used, and their drying and other qualities are commonly injured thereby. Nor do we advise him to purchase ready-made compositions and tints that he can produce better by mixture, for this is to submit his own skill and knowledge to the inferior skill, and for the gain of others; yet we by no means counsel the painter to lose his time in the manufacturing of original pigments, which he can obtain of better quality in the shops. Old pigments are also more to be depended on than new ones for drying, standing, &c. We proceed to speak of colours and pigments individually.

Chapter VII.

OF WHITE AND ITS PIGMENTS.

44. WHITE

Is the basis of nearly all opaque painting designed for the laying and covering of grounds, whether they be of wood-work, metal, stone, plaister, or other substances, and should be as pure and neutral in colour as possible, for the better mixing and compounding with other colours without changing their hues, while it renders them of lighter shades, and of the tints required; it also gives solid body to all colours.

45. It is the most advancing of colours; that is, it comes forward and catches the eye before all other colours, and it assists in giving this quality to other colours with which it may be mixed, by rendering their tints lighter and more vivid. Hence it appears to throw other colours back which are placed near it, and it powerfully contrasts dark colours, and black most so of all. The term *colour* is however equivocal when attributed to the *neutrals*, White, Black and Greys, yet the artist is bound to regard them as colours; and in philosophic strictness they are such latently, compounded and compensated; for a thing cannot but be that of which it is composed, and the neutrals are composed of and comprehend all colours.

46. White is the nearest among colours in relation to Yellow, and is in itself a pleasing and cheerful colour, which takes every hue, tint, and shade, and harmonizes with all other colours, and is the contrast of Black, added to which

it gives solidity in mixture, and a small quantity of black added to white cools it, and preserves it from its tendency to turn yellow. White mixed with Black forms various Greys and Lead-colour so called.

47. From the above qualities of white it is of more extensive use in painting than any other colour, and it is hence of the first importance to the painter to have its pigments of the best quality. These are abundant, of which we shall here notice those only of practical importance to the painter and decorator.

48. Notwithstanding white pigments are an exceedingly numerous class, an unexceptionable white is still a desideratum. The white earths are destitute of body in oil and varnish, and metallic whites of the best body are not permanent in water; yet when properly discriminated, we have eligible whites for most purposes, of which the following are the principal;—

49. WHITE LEAD,

Or ceruse, and other white oxides of lead, under the various denominations of London and Nottingham whites, &c., Flake white, Crems or Cremnitz white, Roman and Venetian whites, Blanc d'argent or Silver white, Sulphate of lead, Antwerp white, &c. The heaviest and whitest of these are the best, and in point of colour and body are superior to all other whites. They are all, when pure and properly applied in oil and varnish, safe and durable, and dry well without addition; but excess of oil discolours them, and in water-painting they are changeable even to blackness. They have also a destructive effect upon all vegetal lakes, except

the madder lakes, and madder carmines; they are equally injurious to red and orange leads or minium, king's and patent yellow, massicot, gamboge, orpiments, &c.: but ultramarine, red and orange vermilions, yellow and orange chromes, madder colours, sienna earth, Indian red, and all the ochres, compound with these whites with little or no injury. In oil painting white lead is essential in the ground, in dead colouring, in the formation of tints of all colours, and in scumbling, either alone or mixed with all other pigments. It is also the best local white when neutralized with black, but must not be employed in water-colour painting, distemper, crayon painting, or fresco, nor with any pigment having an inflammable basis, or liable to be destroyed by fire: for with all such they occasion change of colour, either by becoming dark themselves, or by fading the colours they are mixed with. Cleanliness in using these pigments is necessary for health; for though not virulently poisonous, they are pernicious when taken into or imbibed by the pores or otherwise, as are all other pigments of which lead is the basis. A fine natural white oxide, or carbonate of lead, would be a valuable acquisition, if found in abundance; and there occur in Cornwall specimens of a very beautiful carbonate of lead, of spicular form, brittle, soft, and purely white, which should be collected for the artist's use.

The following are the true characters of these whites according to our particular experience:—

50. LONDON AND NOTTINGHAM WHITES.

The best of these do not differ in any essential particular mutually, nor from the white leads of other manu-

factories. The latter, being prepared from flake white, is generally the greyest of the two. The inferior white leads are adulterated with whitening or sulphat of barytes and other earths, which injure them in body and brightness, dispose them to dry more slowly, to keep their places less firmly, and to discolour the oil with which they are applied. All the above are carbonates of lead, and liable to froth or bubble when used with aqueous, spirituous, or acid preparations. There are no better whites for architectural painting, and for all the purposes of common oil painting, they are kept in the shops under the names of best and common white leads ready ground in oil, and require only to be duly diluted with linseed oil and more or less turpentine according to the work; and also for mixing with other colours and producing tints.

51. KREMS, CREMS, OR KREMNITZ WHITE,

Is a white carbonate of lead, which derives its names from Crems, or Krems, in Austria, or Kremnitz in Hungaria, and is called also Vienna white, being brought from Vienna in cakes of a cubical form. Though highly reputed, it has no superiority over the best English white leads, and varies like them according to the degrees of care or success with which it has been prepared.

52. FLAKE WHITE

Is an English white lead in form of scales or plates, sometimes grey on the surface. It takes its name from its figure, is equal or sometimes superior to Crems white, and is an oxidized carbonate of lead, not essentially differing from the

best of the above. Other white leads seldom equal it in body, and, when levigated, it is called body-white.

53. BLANC D'ARGENT,

Or Silver white. These are false appellations of a white lead, called also French white. It is brought from Paris in the form of drops, is exquisitely white, but of less body than flake white, and has all the properties of the best white leads; but, being liable to the same changes, is unfit for general use as a water-colour, though good in oil or varnish.

54. ROMAN WHITE

Is of the purest white colour, but differs from the former only in the warm flesh-colour of the external surface of the large square masses in which it is usually prepared. This and the following are not generally found in the shops.

55. SULPHATE OF LEAD

Is an exceedingly white precipitate from any solution of lead by sulphuric acid, much resembling the blanc d'argent; and has, when well prepared, quite neutral, and thoroughly edulcorated or washed, most of the properties of the best white leads, but is rather inferior in body and permanence.

The above are the principal whites of lead; but there are many other whites used in painting, of which the following are the most worthy of attention:—

56. ZINC WHITE

Is an oxide of zinc, which has been more celebrated as a

pigment than used, being perfectly durable in water and oil, but wanting the body and brightness of fine white leads in oil; while in water, constant or barytic white, is superior to it in colour, and equal in durability. Nevertheless, zinc white is valuable, as far as its powers extend in painting, on account of its durability both in oil and water, and its innocence with regard to health. And when duly and skilfully prepared, the colour and body of this pigment are sufficient to qualify it for a general use upon the palette, although the pure white of lead must merit a preference, in oil. Zinc white is obtainable of the Artist's colourmen.

57. TIN WHITE

Resembles zinc white in many respects, but dries badly and has even less body and colour in oil, though superior to it in water. It is the basis of the best white in enamel painting.

There are various other metallic whites of great body and beauty,—such are those of bismuth, antimony, quicksilver and arsenic; but none of them are of any value or reputation in painting, on account of their great disposition to change of colour, both by light and foul air, in water and in oil; and are procurable only of the chemists.

58. PEARL WHITE.

There are the two pigments of this denomination: one falsely so-called, prepared from bismuth, which turns black in sulphuretted hydrogen gas or any impure air, and is used as a cosmetic; the other, prepared from the waste of pearls and mother-of-pearl, which is exquisitely white, and of good

body in water, but of little force in oil or varnish: it combines, however, with all other colours without injuring the most delicate, and is itself perfectly permanent and innoxious.

59. CONSTANT WHITE,

Permanent white, or Barytic white, is a sulphate of barytes, and when well prepared and free from acid is one of our best whites for water-painting, being of a superior body in water, but destitute of this quality in oil.

As it is of a poisonous nature, it must be kept from the mouth;—in other respects and properties it resembles the true pearl white. Both these pigments should be employed with as little gum as possible, as it destroys their body, opacity, or whiteness; and solution of gum ammoniac answers better than gum arabic, which is commonly used: but the best way of preparing this pigment, and other terrene whites, so as to preserve their opacity, is to grind them in simple water, and to add toward the end of the grinding sufficient only of size, or clear cold gelly of gum tragacanth to attach them to the ground in painting. Barytic white is seldom well purified from free acid, and, therefore, apt to act injuriously on other pigments.

60. WHITE CHALK.

Is a well-known native carbonate of lime, used by the artist only as a crayon, or for tracing his designs; for which purpose it is sawed into lengths suited to the port crayon. White crayons and tracing-chalks, to be good, must work and cut free from grit. From this material whitening and lime are prepared, and are the basis of many common

pigments and colours used in distemper, paper-staining, &c.

61. There are many terrene whites under equivocal names, among them are Morat or Modan white, Spanish white or Troys, or Troy white, Rouen white, Bougeval white, Paris white, Blanc de Roi, China white, Satin white, the latter of which is a sulphate of lime and alumine which dries with a glossy surface, is said to be prepared by mixing equal quantity of lime and alum, the first slacked and the latter dissolved in water. The common oyster-shell contains also a soft white in its thick part, which is good in water; and egg-shells have been prepared for the same purpose; as may likewise an endless variety of native earths, as well as those produced by art. From this unlimited variety of terrene whites we have selected above such only as merit the attention of the artist; the rest may be variously useful to the paper-stainer, plasterer, and painter in distemper; but the whole of them are destitute of body in oil, and, owing to their alkaline nature, are injurious to many colours in water, as they are to all colours which cannot be employed in fresco.

62. TINTS.

White is every way of importance in painting, not only as a ground, but as the basis of all tints, and as necessary in compounding the endless variety of pale hues which taste and fashion require of the painter and decorator, which every season brings out under new denominations, which are in turn to give way to others and be forgotten. Thus white tinted with blue, &c., have afforded Paris white, &c.,

French greys, Silver greys, &c.; while reds tint white of pink, carnation, coquilicot, and all the blushes of flowers, &c.; and yellow with white has afforded Primrose, Straw-colour, Isabella, &c. To the more or less compound colours with white we are indebted for the innumerable tints of Lilac, Lavender, Peach-blossoms, Pea-green, Tea-green, &c., to prescribe formulæ for which, after the principles advanced, would be an insult to common sense.

Chapter VIII.

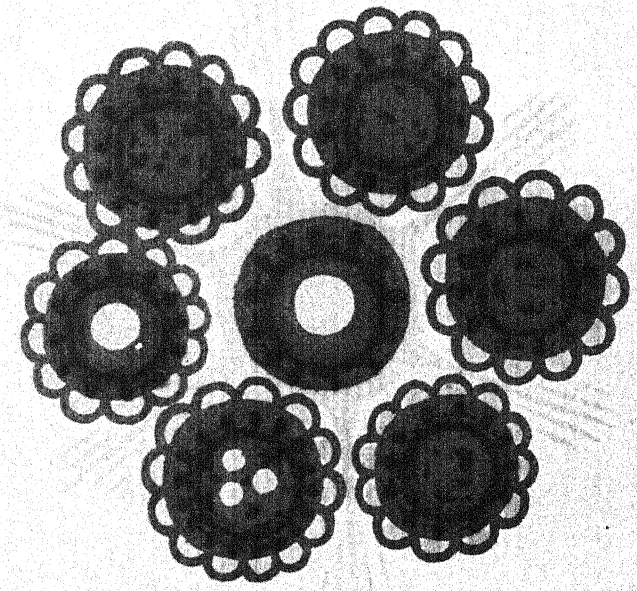
OF THE PRIMARY COLOURS.

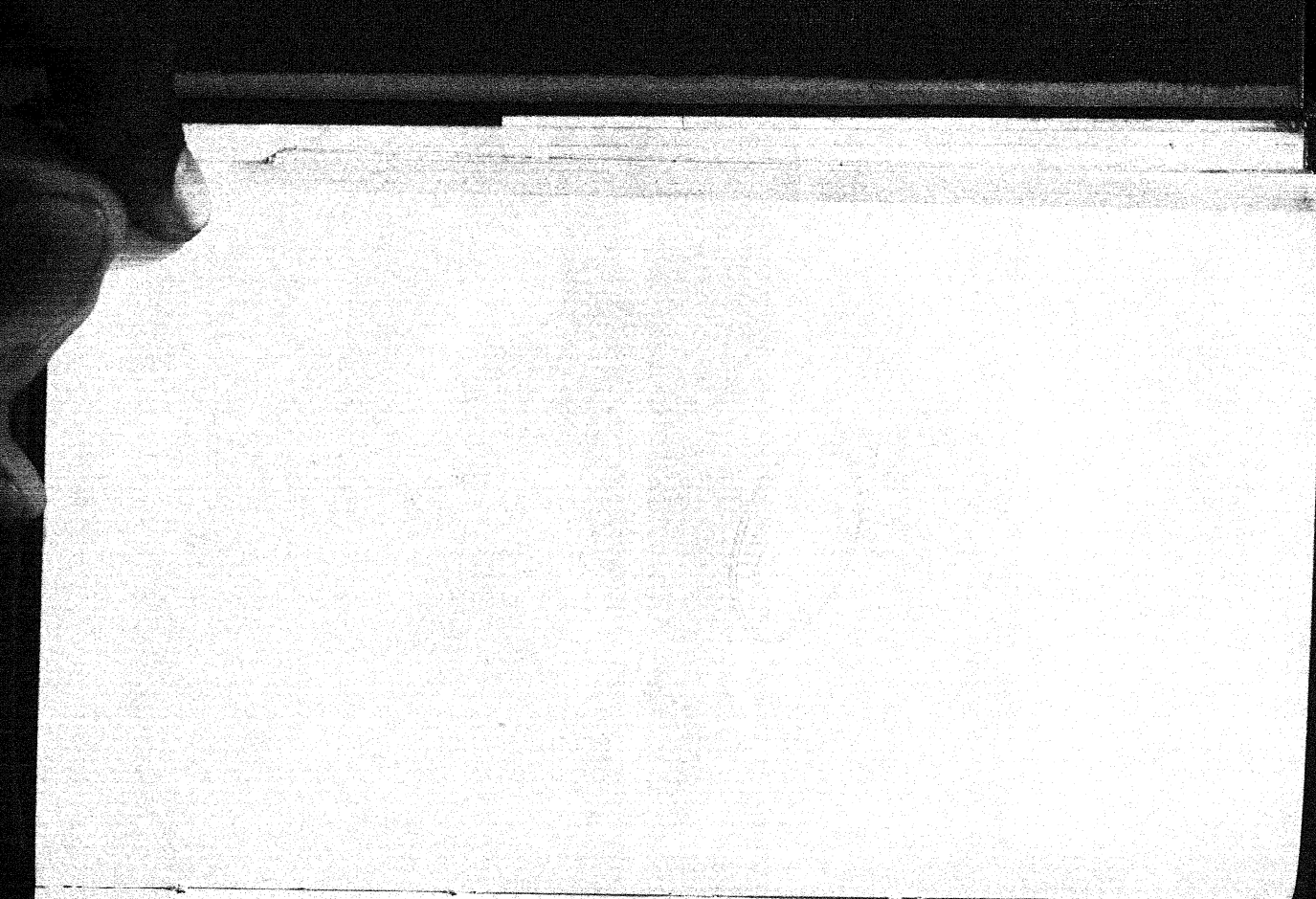
63. OF YELLOW.

Yellow is the first of the primary or simple colours, nearest in relation to, and partaking most of the nature of, the neutral white, mixed with which it affords the faint hues called Straw-colour, &c.; it is accordingly a most advancing colour, of great power in reflecting light. Compounded with the primary red, it constitutes the secondary orange, and its relatives, scarlet, &c. and other warm colours.

64. It is the ruling colour of the tertiary citrine;—it characterizes in like manner the endless variety of the semi-neutral colours called brown, and enters largely into the complex colours denominated buff, bay, tawny, tan, dun, drab, chesnut, roan, sorrel, hazel, auburn, Isabella, fawn, feuillemorte, &c. Yellow is naturally associated with red in transient and prismatic colours, and they comport themselves

Fig 12.





with similar affinity and glowing accordance in painting, as well in conjunction as composition. In combination with the primary *blue*, yellow constitutes all the variety of the secondary *green*, and, subordinately, the tertiaries *russet* and *olive*. It enters also in a very subdued degree into cool, semi-neutral, and broken colours, and assists in minor proportion with blue and red in the composition of *black*.

65. As a pigment, yellow is a tender delicate colour, easily defiled, when pure, by other colours. In painting it diminishes the power of the eye by its action in a strong light, while itself becomes less distinct as a colour; and, on the contrary, it assists vision and becomes more distinct as a colour in a neutral somewhat declining light. These powers of colours upon vision require the particular attention of the colourist. To remedy the ill effect arising from the eyes having dwelt upon a colour, they should be gradually passed to its opposite colour, and refreshed in the clear light of day.

66. In a warm light, yellow becomes totally lost, but is less diminished than all other colours, except white, by distance. The stronger tones of any colour subdue its fainter hues in the same proportion as opposite colours and contrasts exalt them. The contrasting colours of yellow are a purple inclining to blue when the yellow inclines to orange, and a purple inclining to red when the yellow inclines to green, in the mean proportions of thirteen purple to three of yellow, measured in surface or intensity; and yellow being nearest to the neutral white in the natural scale of colours, it accords with it in conjunction. Of all colours, except white, it contrasts black most powerfully.

67. The sensible effects of yellow are gay, gaudy, glorious, full of lustre, enlivening, and irritating; and its impressions on the mind partake of these characters, and acknowledge also its discordances.

68. The substitution of gold, &c., for yellow by the poets may have arisen not less from the great value and splendour of the metal, than from the paucity of fine yellows among those ancients who celebrated the Tyrian purple or red, and the no less famed Armenian blue;—so in the beautiful illuminated MSS. of old, and in many ancient paintings, which glowed with vermilion and ultramarine, the place of yellow was supplied by gilding, and in most cases the artist trusts to the gilding of his frame for some portion of the effect of this colour in his picture: and in every case of decorating with gildings similar allowance should be made.

69. Yellow is a colour abundant throughout nature, and its class of pigments abounds in similar proportion. We have arranged them under the following heads, agreeably to our plan, according to their definiteness and brilliancy of colour; first, the opaque, and then the transparent, or finishing colours. It may be observed of yellow pigments, that they much resemble whites in their chemical relations in general, and that yellow being a primary, and, therefore, a simple colour, cannot be composed by any mixture of other colours.

70. CHROME YELLOW

Is a pigment of modern introduction into general use, and of considerable variety, which are mostly chromates of lead, in which the latter metal more or less abounds. They are

distinguished by the pureness, beauty, and brilliancy of their colours, which qualities are great temptations to their use in the hands of the painter; they are notwithstanding far from unexceptionable pigments;—yet they have a good body, and go cordially into tint with white, both in water and oil; but used alone, or in tint, they after some time lose their pure colour, and may even become black in impure air: they nevertheless resist the sun's rays during a long time. Upon several colours they produce serious changes, ultimately destroying Prussian and Antwerp blues, when used therewith in the composition of greens, &c.

71. JAUNE MINERALE.

This pigment is also a chromate of lead, prepared in Paris, differing in no essential particular from the above, except in the paleness of its colour. The chrome yellows have also obtained other names from places or persons from whence they have been brought, or by whom they have been prepared, such as Jaune de Cologne; we pass over, however, such as have not been generally received. The following pigment passes also under the name of Jaune Minerale:—

72. PATENT YELLOW,

Turner's yellow, or *Montpellier yellow*, is a submuriate or chloruret of lead, which metal is the basis of most opaque yellow pigments; it is a hard, ponderous, sparkling substance, of a crystalline texture and bright yellow colour; hardly inferior, when ground, to chromic yellow. It has an excellent body, and works well in oil and water, but is soon injured both by the sun's light and impure air;

it is therefore little used, except for the common purposes of painting.

73. NAPLES YELLOW

Is a compound of the oxides of lead and antimony, aniently prepared at Naples under the name of *Giallolini*; it is supposed also to have been a native production of Vesuvius and other volcanos, and is a pigment of deservedly considerable reputation. It is not so vivid a colour as either of the above, but is variously of a pleasing light, warm, yellow tint. Like all the preceding yellows it is opaque and in this sense is of good body, and covers well. It is not changed by the light of the sun, and may be used safely in oil or varnish, under the same management as the whites of lead: but, like these latter pigments also, it is liable to change even to blackness by damp and impure air when used as a water-colour, or unprotected by oil or varnish.

74. Iron is also destructive of the colour of Naples yellow, on which account great care is requisite, in grinding and using it, not to touch it with the common steel palette-knife, but to compound its tints on the palette with a spatula of ivory or horn. For the same reason it may be liable to change in composition with the ochres, Prussian and Antwerp blues, and all other pigments of which iron is an ingredient or principle. Oils, varnishes, and, in some measure strong mucilages, are preventive of chemical action, in the compounding of colours, by intervening and clothing the particles of pigments, and also preserve their colours; and hence, in some instances, heterogeneous and injudicious tints and mixtures have stood well, but are not to be relied on in

practice. Used pure, or with white lead, its affinity with which gives permanency to their tints, Naples yellow is a valuable and proved colour in oil, in which also it works and dries well.

75. It may also be used in enamel painting, as it vitrifies without change, and in this state it was formerly employed under the name of *Giallolini di fornace,* and has been again introduced, under an erroneous conception that vitrification gives permanence to colours, when in truth it only increases the difficulty of levigation, and injures their texture for working. Naples yellow does not appear to have been generally employed by the early painters in oil. Antimony yellows are prepared of various depths.

76. MASSICOT,

Or *Masticot,* is a protoxide of lead, of a pale yellow colour, exceedingly varying in tint from the purest and most tender yellow or straw colour to pale ash colour or grey. It has in painting all the properties of the white lead, from which it is prepared by gentle calcination in an open furnace, but in tint with which, nevertheless, it soon loses its colour and returns to white: if, however, it be used pure or unmixed, it is a useful delicate colour, permanent in oil under the same conditions as white lead, but ought not to be employed in water, on account of its changing in colour even to blackness by the action of damp and impure air. It appears to have been prepared with great care, and successfully employed, by the old masters, and is an admirable dryer, being in its chemical nature nearly the same as litharge, which is also sometimes ground and employed in its stead.

77. YELLOW OCHRE,

Called also *Mineral yellow*, is a native pigment, found in most countries, and abundantly in our own. It varies considerably in constitution and colour, in which latter particular it is found from a bright but not very vivid yellow to a brown yellow, called *spruce ochre*, and is always of a warm cast. Its natural variety is much increased by artificial dressing and compounding. The best yellow ochres are not powerful, but as far as they go are valuable pigments, particularly in fresco and distemper, being neither subject to change by ordinary light, nor much affected by impure air or the action of lime; by time, however, and the direct rays of the sun they are somewhat darkened, and by burning are converted into light reds. They are among the most ancient of pigments, may all be produced artificially in endless variety as they exist in nature, and iron is the principle colouring matter in them all. The following are the principal species, but they are often confounded:—

78. OXFORD OCHRE

Is a native pigment from the neighbourhood of Oxford, semi-opaque, of a warm yellow colour and soft argillaceous texture, absorbent of water and oil, in both which it may be used with safety according to the general character of yellow ochres, of which it is one of the best. Similar ochres are found in the Isle of Wight, in the neighbourhood of Bordeaux, and various other places.

79. STONE OCHRE

Has been confounded with the above, which it frequently resembles, as does also Roman ochre. True stone ochres are found in balls or globular masses of various sizes in the solid body of stones, lying near the surface of rocks among the quarries in Gloucestershire and elsewhere. These balls are of a smooth compact texture, in general free from grit, and of a powdery fracture. They vary exceedingly in colour, from yellow to brown, murrey, and grey, but do not differ in other respects from the preceding, and may be safely used in oil or water in the several modes of painting, and for browns and dull reds in enamel. Varieties of ochrous colours are produced by burning and compounding with lighter, brighter, and darker colours, but often very injudiciously, and adversely to the certainty of operation, effect, and durability.

80. ROMAN OCHRE

Is rather deeper and more powerful in colour than the above, but in other respects differs not essentially from them;—a remark which applies equally to yellow ochres of other denominations. There are ochres of every country.

81. BROWN OCHRE,

Spruce Ochre, or *Ocre de Rue,* is a dark-coloured yellow ochre, in no other respects differing from the preceding:—it is much employed, and affords useful and permanent tints. This and all natural ochres require grinding and washing over to separate them from extraneous substances, and they

acquire depth and redness by burning. They form with Prussian blue a variety of greens, and are of use in mixture of other colours.

82. TERRA DI SIENNA,

Or *Raw Sienna Earth*, &c., is also a ferruginous native pigment, and appears to be an iron ore, which may be considered as a crude natural yellow lake, firm in substance, of a glossy fracture, and very absorbent. It is in many respects a valuable pigment,—of rather an impure yellow colour, but has more body and transparency than the ochres; and being little liable to change by the action of either light, time, or impure air, it may be safely used according to its powers, either in oil or water, and in all the modes of practice. By burning it becomes deeper, orange, and more transparent and drying. See *Burnt Sienna Earth*. It is a valuable colour in graining.

83. IRON YELLOW,

Jaune de Fer, or *Jaune de Mars*, &c., is a bright iron ochre, prepared artificially, of the nature of Sienna earth. In its general qualities it resembles the ochres, with the same eligibilities and exceptions, but is more transparent. The colours of iron exist in endless variety in nature, and are capable of the same variation by art, from sienna yellow, through orange and red, to purple, brown, and black, among which are useful and valuable distinctions, which are brighter and purer than native ochres. They were formerly introduced by the author, and have been lately received under the names of *orange de mars, rouge de mars, brun de mars,*

names which have the merit at least of not misleading the judgment. When carefully prepared, these pigments dry well in proportion to their depth, and have the general habits of sienna earths and ochres.

84. YELLOW ORPIMENT,

Or *Yellow Arsenic,* is a sulphuretted oxide of arsenic, of a beautiful, bright, and pure yellow colour, not extremely durable in water, and less so in oil: in tint with white lead it is soon destroyed. It is not subject to discoloration in impure air. This property is not, however, sufficient to redeem it with the artist, as it has a bad effect upon several valuable colours, such as Naples yellow; and upon the Chromates, Masticot, and Red lead, and most other oxides and metallic colours: but with colours dependent upon sulphur or other inflammables for their hues it may be employed with less danger, and was probably so employed by the old painters, with ultramarine in the composition of their greens; and is well suited to the factitious or French ultramarines. Although this pigment is not so poisonous as white arsenic, it is dangerous in its effect upon health. Yellow orpiment is of several tints, from bright cool yellow to warm orange, the first of which are most subject to change; and it has appeared under various forms and denominations:—these seem to have been used by several of the old masters, with especial care to avoid mixture; and as they dry badly, and the oxides of lead used in rendering oils drying destroy their colour, levigated glass was employed with them as a dryer, or perhaps they were sometimes used in simple varnish. They are found in a native state under the name

of *zarnic* or *zarnich*, varying in colour from warm yellow to green. But orpiment, in all its varieties, powerfully deprives other substances of their oxygen, and therefore is subject to change, and to be changed by, every pigment whose colour depends on that element, and more especially all metallic colours: if employed, they must therefore be so n a pure and unmixed state. See *Orange Orpiment*.

85. KING'S YELLOW.

Yellow orpiment has been much celebrated under this name, as it has also under the denomination of—

CHINESE YELLOW,

Which is a very bright sulphuret of arsenic, brought from China.

ARSENIC YELLOW,

Called also *Mineral Yellow*, is prepared from arsenic fluxed with litharge, and reduced to powder. It is much like orpiment in colour, dries better, and, not being affected by lead, is less liable to change in tint. It must not be forgotten that it is poisonous, nor that all arsenic colours are destructive of every tint of colours mixed with white lead.

86. CADMIUM YELLOW,

Sulphuret of Cadmium. The new metal, cadmium, affords, by precipitation with solution of sulphuretted hydrogen, a bright warm yellow pigment, which passes readily into tints with white lead, appears to endure light, and remain unchanged in impure air; but the metal from which it is

prepared being hitherto scarce, it has been little employed as a pigment, and its habits are, therefore, not ascertained.

87. GAMBOGE;

Or, *Gumboge*, is brought principally, from Cambaja in India, and is the produce of several kinds of trees. Is a concrete vegetal substance, of a gum-resinous nature, and beautiful yellow colour, bright and transparent, but not of great depth. When properly used, it is more durable than generally reputed both in water and oil; and conduces, when mixed with other colours, to their stability and durability, by means of its gum and resin. It is deepened in some degree by ammoniacal and impure air, and somewhat weakened, but not easily discoloured, by the action of light. Time effects less change on this colour than on other bright vegetal yellows; but white lead and other metalline pigments injure, and terrene and alkaline substances redden it. It works remarkably well in water, with which it forms an opaque solution, without grinding or preparation, by means of its natural gum; but is with difficulty used in oil, &c. in a dry state. In its natural state it however dries well, and lasts in glazing when deprived of its gum. Glazed over other colours in water, its resin acts as a varnish which protects them; and under other colours its gum acts as preparation which admits varnishing. It is injured by a less degree of heat than other pigments.

88. GALL-STONE

Is an animal calculus formed in the gall-bladder, principally of oxen. This concretion varies a little in colour, but is in

general of a beautiful golden yellow, more powerful than gamboge, and is highly reputed as a water-colour; nevertheless its colour is soon changed and destroyed by strong light, though not subject to alteration by impure air.

It is rarely introduced in oil painting, and is by no means eligible therein.

89. INDIAN YELLOW

Is a pigment long employed in India under the name *Pwree*, but has not many years been introduced generally into painting in Europe. It is imported in the form of balls and is of a fetid odour. However produced, it appears to be an urio-phosphate of lime, of a beautiful pure yellow colour, and light powdery texture; of greater body and depth than gamboge, but inferior in these respects to gall-stone. Indian yellow resists the sun's rays with singular power in water-painting; yet in ordinary light and air, or even in a book or portfolio, the beauty of its colour is not lasting. It is not injured by foul air, and in oil is exceedingly fugitive, both alone and in tint.

90. YELLOW LAKE.

There are several pigments of this denomination, varying in colour and appearance acccording to the colouring substances used and modes of preparation. They are usually in the form of drops, and their colours are in general bright yellow, very transparent, and not liable to change in an impure atmosphere,—qualities which would render them very valuable pigments, were they not soon discoloured, and even destroyed, by the opposite influence of oxygen

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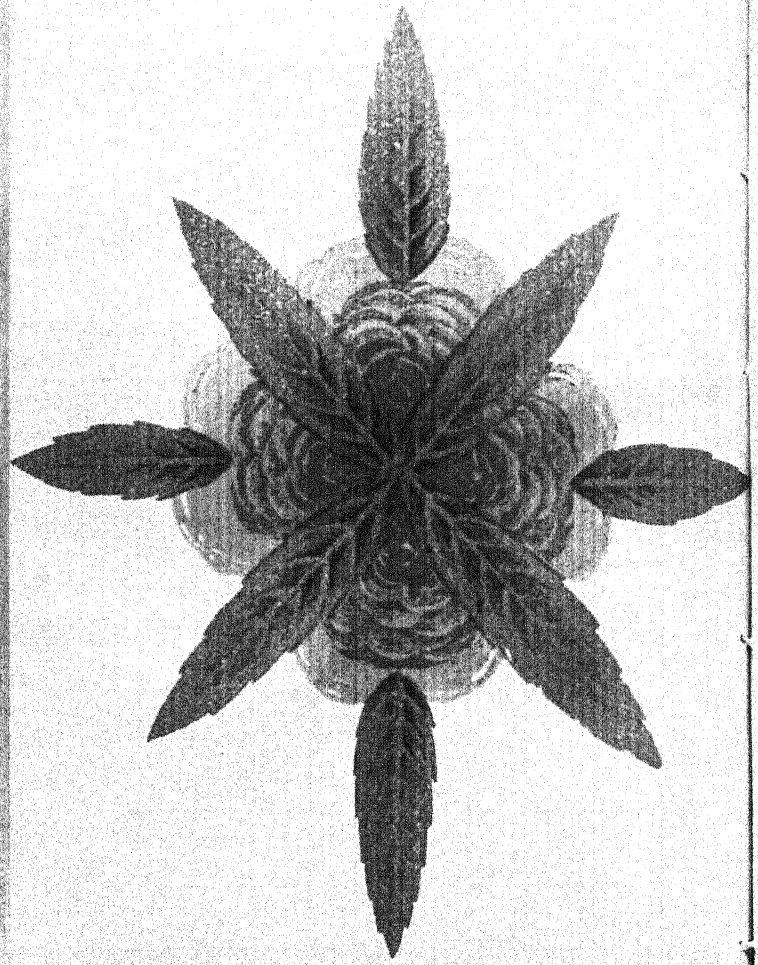

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and light, both in water and oil; in which latter vehicle, like other lakes in general, they are bad dryers, and do not stand the action of white lead or metallic colours. If used therefore, it should be as simple as possible.

91. DUTCH PINK, ENGLISH AND ITALIAN PINKS,

Are sufficiently absurd names of yellow colours prepared by impregnating whitening, &c., with vegetal yellow tinctures, in the manner of rose pink, from which they borrow their name.

They are bright yellow colours, extensively used in distemper and for paper-staining, and other ordinary purposes; but are little deserving attention in the higher walks of art, being in every respect inferior even to the yellow lakes, except the best kinds of English and Italian pinks, which are, in fact, yellow lakes, and richer in colour than the pigments generally called yellow lake.

The pigment called *Stil*, or *Stil de Grain*, is a similar preparation, and a very fugitive yellow, the darker kind of which is called brown-pink.

CHAPTER IX.

OF RED.

92. Red is the second and intermediate of the primary colours, standing between *yellow* and *blue*; and in like intermediate relation also to *white* and *black*, or light and shade. Hence it is pre-eminent among colours, as well as

the most positive of all, forming with yellow the secondary *orange* and its near relatives, scarlet, &c.; and with blue, the secondary *purple* and its allies, crimson, &c. It gives some degree of warmth to all colours, but most to those which partake of yellow.

93. It is the archeus, or principal colour, in the tertiary *russet;* enters subordinately into the two other tertiaries, *citrine* and *olive;* goes largely into the composition of the various hues and shades of the semi-neutral *marrone,* or chocolate, and its relatives, puce, murrey, morello, mordore, pompadour, &c; and more or less into *browns, greys,* and all broken colours. It is also the second power in harmonizing and contrasting other colours, and in compounding *black,* and all neutrals, into which it enters in the proportion of five,—to blue, eight,—and yellow, three.

94. Red is a colour of double power in this respect also; that in union or connexion with yellow it becomes hot and *advancing;* but mixed or combined with blue, it becomes cool and *retiring.* It is, however, more congenial with *yellow* than with blue, and thence partakes more of the character of the former in its effects of warmth, of the influence of light and distance, and of action on the eye, by which the power of vision is diminished upon viewing this colour in a strong light; while on the other hand, red itself appears to deepen in colour rapidly in a declining light as night comes on, or in shade. These qualities of red give it great importance, render it difficult of management, and require it to be kept in general subordinate in painting; hence it is rarely used unbroken, or as the predominating colour, on which account it will always appear detached or insulated, unless it

be repeated and subordinate in a composition. Accordingly Nature uses red sparingly, and with as great reserve in the decoration of her works as she is profuse in lavishing green upon them; which is of all colours the most soothing to the eye, and the true compensating colour, or contrasting or harmonizing equivalent of red, in the proportional quantity of eleven to five of red, according to surface or intensity; and is, when the red inclines to scarlet or orange, a *blue-green;* and, when it inclines to crimson or purple, is a *yellow-green.*

95. Red breaks and diffuses with white with peculiar loveliness and beauty; but it is discordant when standing with orange only, and requires to be joined or accompanied by their proper contrast, to resolve or harmonize their dissonance.

In landscapes, &c., abounding with hues allied to green, a red object, properly posited according to such hues in light, shade, or distance, conduces wonderfully to the life, beauty, harmony, and connexion of the colouring; and this colouring is the chief element of beauty in floreal nature, the prime contrast and ornament of the green garb of the vegetal kingdom.

96. *Red* being the most *positive* of colours, and having the *middle* station of the primaries, while *black* and *white* are the *negative* powers or neutrals of colours, and the *extremes* of the scale,—red contrasts and harmonizes these neutrals; and, as it is more nearly allied to white or light than to black or shade, this harmony is most remarkable in the union or opposition of white and red, and this contrast most powerful in black and red.

97. As a colour, red is in itself pre-eminently beautiful, powerful, cheering, splendid, and ostentatious, and communicates these qualities to its two secondaries, and their sentiments to the mind.

98. Red being a primary and simple colour, cannot be composed by mixture of other colours; it is so much the instrument of beauty in nature and art in the colour of flesh, flowers, &c., that good pigments of this genus may of all colours be considered the most indispensable: we have happily, therefore, many of this denomination, of which the following are the principal:—

99. VERMILION

Is a sulphuret of mercury, which, previous to its being levigated, is called *cinnabar*. It is an ancient pigment, the κιννάβαρι of the Greeks, and is both found in a native state and produced artificially. The Chinese possess a native cinnabar so pure as to require grinding only to become very perfect vermilion, not at all differing from that imported in large quantities from China.

100. Chinese vermilion is of a cooler or more crimson tone than that generally manufactured from factitious cinnabar in England, Holland, and different parts of Europe. The artificial, which was anciently called *minium*, a term now confined to red lead, does not differ from the natural in any quality essential to its value as a pigment; it varies in tint from dark red to scarlet; and both sorts are perfectly durable and unexceptionable pigments. It is true, nevertheless, that vermilions have obtained the double disrepute of fading in a strong light and of becoming black

or dark by time and impure air; but colours, like characters, suffer contamination and disrepute from bad association: it has happened, accordingly, that vermilion which has been rendered lakey or crimson by mixture with lake or carmine, has faded in the light, and that when it has been toned to the scarlet hue by red or orange lead it has afterwards become blackened in impure air, &c., both of which adulterations were formerly practised, and hence the ill-fame of vermilion both with authors and artists. We therefore repeat, that neither light, time, nor foul air, effect sensible change in true vermilions, and that they may be used safely in either water, oil, or fresco,—being colours of great chemical permanence, unaffected by other pigments, and among the least soluble of chemical substances.

101. Good vermilion is a powerful vivid colour, of great body, weight, and opacity; when pure, it will be entirely decomposed and dissipated by fire in a red heat, and is, therefore, in respect to the above mixtures, easily tested.

The following brilliant pigment from iodine has been improperly called vermilion, and, if it should be used to dress or give unnatural vividness to true vermilion, may again bring it into disrepute. When red or orange lead has been substituted for or used in adulterating vermilion, muriatic acid applied to such pigments will turn them more or less white or grey; but pure vermilions will not be affected by the acid, nor will they by pure or caustic alkalis, which change the colour of the reds of iodine. By burning more or less, vermilion may be brought to the colour of most of the red ochres.

102. IODINE SCARLET

Is a new pigment of a most vivid and beautiful scarlet colour, exceeding the brilliancy of vermilion. It has received several false appellations, but is truly an *Iodide or Bi-iodide of mercury*, varying in degrees of intense redness. It has the body and opacity of vermilion, but should be used with an ivory palette-knife, as iron and most metals change it to colours varying from yellow to black. Strong light rather deepens and cools it, and impure air soon utterly destroys its scarlet colour, and even metallizes it in substance. The charms of beauty and novelty have recommended it, particularly to amateurs; and dazzling brilliancy might render it valuable for high and fiery effects of colour, if any mode of securing it from change should be devised, at any rate it should be used pure or alone. By time alone these colours vanish in a thin wash or glaze without apparent cause, and they attack almost every metallic substance, and some of them even in a dry state. When used in water, gum ammoniac appears to secure it from change; and it has been observed that, when gamboge is glazed over it, it preserves its hue with constancy.

103. RED LEAD,

Minium, or *Saturine red*, is an ancient pigment, by some old writers confounded with cinnabar, and called *Sinoper* or *Synoper*, is a deutoxide of lead, prepared by subjecting massicot to the heat of a furnace with an expanded surface and free accession of air. It is of a scarlet colour and fine hue, warmer than common vermilion; bright, but not

so vivid as the bi-iodide of mercury; though it has the body and opacity of both these pigments, and has been confounded, even in name, with vermilion, with which it was formerly customary to mix it. When pure and alone, light does not effect its colour; but white lead, or any oxide or preparation of that metal mixed with it, soon deprives it of colour, as acids do also; and impure air will blacken and ultimately metallize it.

104. On account of its extreme fugitiveness when mixed with white lead, it cannot be used in tints; but employed, unmixed with other pigments in simple varnish or oil not rendered drying by any metallic oxide it it may, under favourable circumstances, stand a long time; hence red lead has had a variable character for durability. It is in itself, however, an excellent dryer in oil, and has in this view been employed with other pigments; but, as regards colour, it cannot be mixed safely with any other pigments than the ochres, earths, and blacks in general. Used alone, it answers, however, as a good red paint for common purposes.

105. RED OCHRE

Is a name proper rather to a class than an individual pigment, and comprehends *Indian red, light red, Venetian red, scarlet ochre, Indian ochre, redding, ruddle, bole,* &c., beside other absurd appellations, such as *English vermilion* and *Spanish brown,* or *majolica.*

106. The red ochres are, for the most part, rather hues and tints than definite colours, or more properly classed with the tertiary, semi-neutral, and broken colours; they

are nevertheless, often very valuable pigments for their tints in dead colouring, and for their permanence, &c., in water, oil, crayons, distempers, and fresco, and in a low tone of colouring have the value of primaries. The greater part of them are native pigments, found in most countries, and very abundantly and fine in our own; but some are productions of manufacture, and we have produced them in the variety of nature by art. The following are the most important of these pigments, most of which are available in enamel-painting.

107. INDIAN RED,

According to its name, is brought from Bengal, and is a very rich iron ore, hematite, or peroxide of iron. It is an anomalous red, of a purple-russet hue, of a good body, and valued when fine for the pureness and lakey tone of its tints. In a crude state it is a coarse powder, full of extremely hard and brilliant particles of a dark appearance, sometimes magnetic, and is greatly improved by grinding and washing over. Its chemical tendency is to deepen, nevertheless it is very permanent; neither light, impure air, mixture with other pigments, time, nor fire, effecting in general any sensible change in it; and being opaque, it covers well. This pigment varies considerably in its hues; that which is most rosy being esteemed the best, and affording the purest tints: inferior red ochres have been formerly substituted for it, and have procured it a variable character, but it is now obtained abundantly, and may be had pure of respectable colourmen. *Persian red* is another name for this pigment.

108. LIGHT RED

Is an ochre of a russet-orange hue, principally valued for its tints. The common light red is brown ochre burnt, but the principal yellow ochres afford this colour best; and the brighter and better the yellow ochre is from which this pigment is prepared, the brighter will this red be, and the better flesh tints will it afford with white. There are, however, native ochres brought from India and other countries which supply its place, some of which become darkened by time and impure air; but in other respects light red has the general good properties of other ochres, dries admirably, and is much used both in figure and landscape painting. It affords also an excellent crayon.

Terra puzzoli and carnagione of the Italians, differ from the above only in its hue, in which respect other denominations are produced by dressing and compounding.

109. VENETIAN RED,

Or *Scarlet ochre.* True Venetian red is said to be a native ochre, but the colours sold under this name are prepared artificially from sulphate of iron, or its residuum in the manufacturing of acids. They are all of redder and deeper hues than light red, are very permanent, and have all the properties of good ochres.

Prussian red, English red, Rouge de Mars, are other names for the same pigment, and Spanish red is an ochr differing little from Venetian red.

110. DRAGON'S BLOOD

Is a resinous substance, brought principally from the East Indies. It is of a warm semi-transparent, rather dull, red colour, which is deepened by impure air, and darkened by light. There are two or three sorts, but that in drops is the best. White lead soon destroys it, and it dries with extreme difficulty in oil. It is sometimes used to colour varnishes and lackers, being soluble in oils and alcohol; but notwithstanding it has been recommended as a pigment, it does not merit the attention of the artist. It was anciently called Cinnabar.

111. LAKE,

A name derived from the *lac* or *lacca* of India, is the cognomen of a variety of transparent red and other coloured pigments of great beauty, prepared for the most part by precipitating coloured tinctures of dyeing drugs upon alumine and other earths, &c. The lakes are hence a numerous class of pigments, both with respect to the variety of their appellations and the substances from which they are prepared. The colouring matter of common lake is Brazil wood, which affords a very fugitive colour. Superior red lakes are prepared from cochineal, lac, and kermes; but the best of all are those prepared from the root of the *rubia tinctoria*, or madder plant. Of the various red lakes the following are the principal:—

All lakes ground in linseed oil are disposed to fatten, or become livery, but ground stiff in poppy oil they keep better for use.

112. RUBRIC, OR MADDER LAKES.

These pigments are of various colours, of which we shall speak at present of the red or rose colours only; which have obtained, from their material, their hues, or their inventor, the various names of rose rubiate, rose madder, pink madder, and Field's lakes.

The pigments formerly called madder lakes were brick-reds of dull ochrous hues; but for many years past these lakes have been prepared perfectly transparent, and literally as beautiful and pure in colour as the rose; qualities in which they are unrivalled by the lakes and carmine of cochineal. The rose colours of madder have justly been considered as supplying a desideratum, and as the most valuable acquisition of the palette in modern times, since perfectly permanent transparent reds and rose colours were previously unknown to the art of painting.

113. These pigments are of hues warm or cool, from pure pink to the deepest rose colour;—they afford the purest and truest carnation colours known;—form permanent tints with white lead; and their transparency renders them perfect glazing or finishing colours. They are not liable to change by the action of either light or impure air, or by mixture with other pigments; but when not thoroughly edulcorated they are, in common with all lakes, tardy dryers in oil, the best remedy for which is the addition of a small portion of japanner's gold-size: or, as they are too beautiful and require saddening for the general uses of the painter, the addition of manganese brown, cappagh brown, or of burnt umber, as was the practice of the Venetian

painters in the using of lake, adds to their powers and improves their drying in oils.

Though little known in ordinary painting they have been established by experience on the pallettes of our first masters during nearly half a century. Madder lake may be tested by liquid ammonia in which its colour is *not* soluble as those of other lakes and carmine are. The red and russet of *fig.* 5, are those of madder.

114. SCARLET LAKE

Is prepared in form of drops from cochineal, and is of a beautiful transparent red colour and excellent body, working well both in water and oil, though, like other lakes, it dries slowly. Strong light discolours and destroys it both in water and oil; and its tints with white lead, and its combinations with other pigments, are not permanent; yet when well prepared and judiciously used in sufficient body, and kept from strong light, it has been known to last many years; but it ought never to be employed in glazing, nor at all in performances that aim at high reputation and durability. It is commonly tinted with vermilion, which has probably been mixed with lakes at all times to give them scarlet hue and add to their weight; *Florentine lake, Hamburgh lake, Chinese lake, Roman* and *Venetian lakes,* are but varieties of the same pigment.

115. LAC LAKE,

Prepared from the *lac* or *lacca* of India, is perhaps the first of the family of lakes, and resembles the former from

Cochineal in being the production of similar insects. Its colour is rich, transparent and deep,—less brilliant and more durable than that of cochineal, but inferior in both these respects to the colours of madder. Used in body or strong glazing, as a shadow colour, it is of great power and much permanence; but in thin glazing it changes and flies, as it does also in tint with white lead.

A great variety of lakes, equally beautiful as those of cochineal, have been prepared from this substance in a recent state in India and China, many of which we have tried, and found uniformly less durable in proportion as they were more beautiful. In the properties of drying, &c., they resemble other lakes.

This appears to have been the lake which has stood best in old pictures, and was probably used by the Venetians, who had the trade of India when painting flourished at Venice. It is sometimes called *Indian Lake*.

116. CARMINE,

A name originally given only to the fine feculences of the tinctures of kermes and cochineal, denotes generally at present any pigment which resembles them in beauty, richness of colour, and fineness of texture: hence we hear of blue and other coloured carmines, though the term is principally confined to the crimson and scarlet colours produced from cochineal by the agency of tin. These carmines are the brightest and most beautiful colours prepared from cochineal,—of a fine powdery texture and velvety richness. They vary from a rose colour to a warm red; work admirably; and are in other respects,

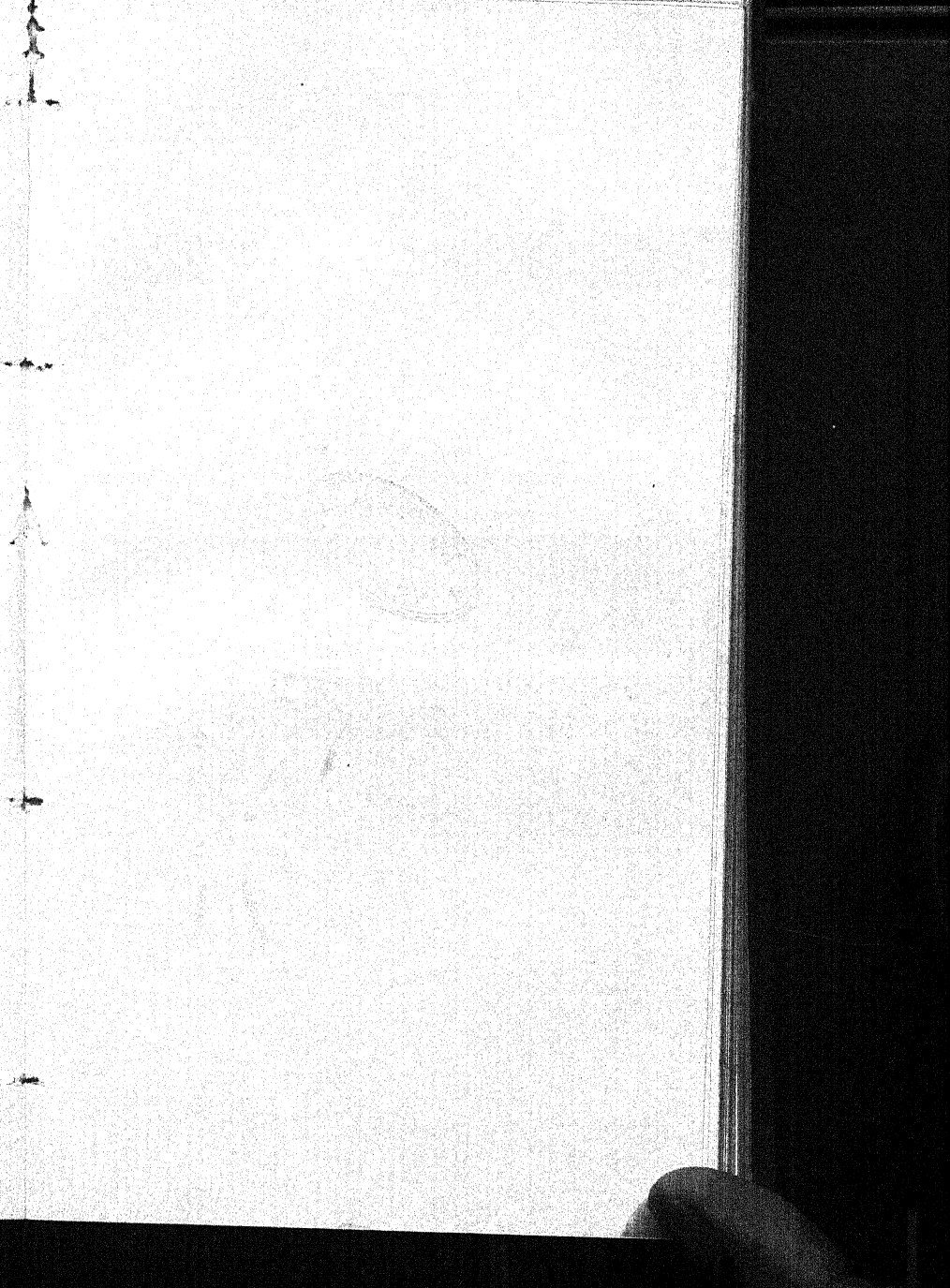
except the most essential—the want of durability—excellent pigments in water and oil: they have not, however, any permanence in tint with white lead, and in glazing are soon discoloured and destroyed by the action of light, but are little affected by impure air, and are in other respects like the lakes of cochineal; all the pigments prepared from which may be tested by their solubility in liquid ammonia, which purples lakes prepared from the woods, but does not dissolve their colours.

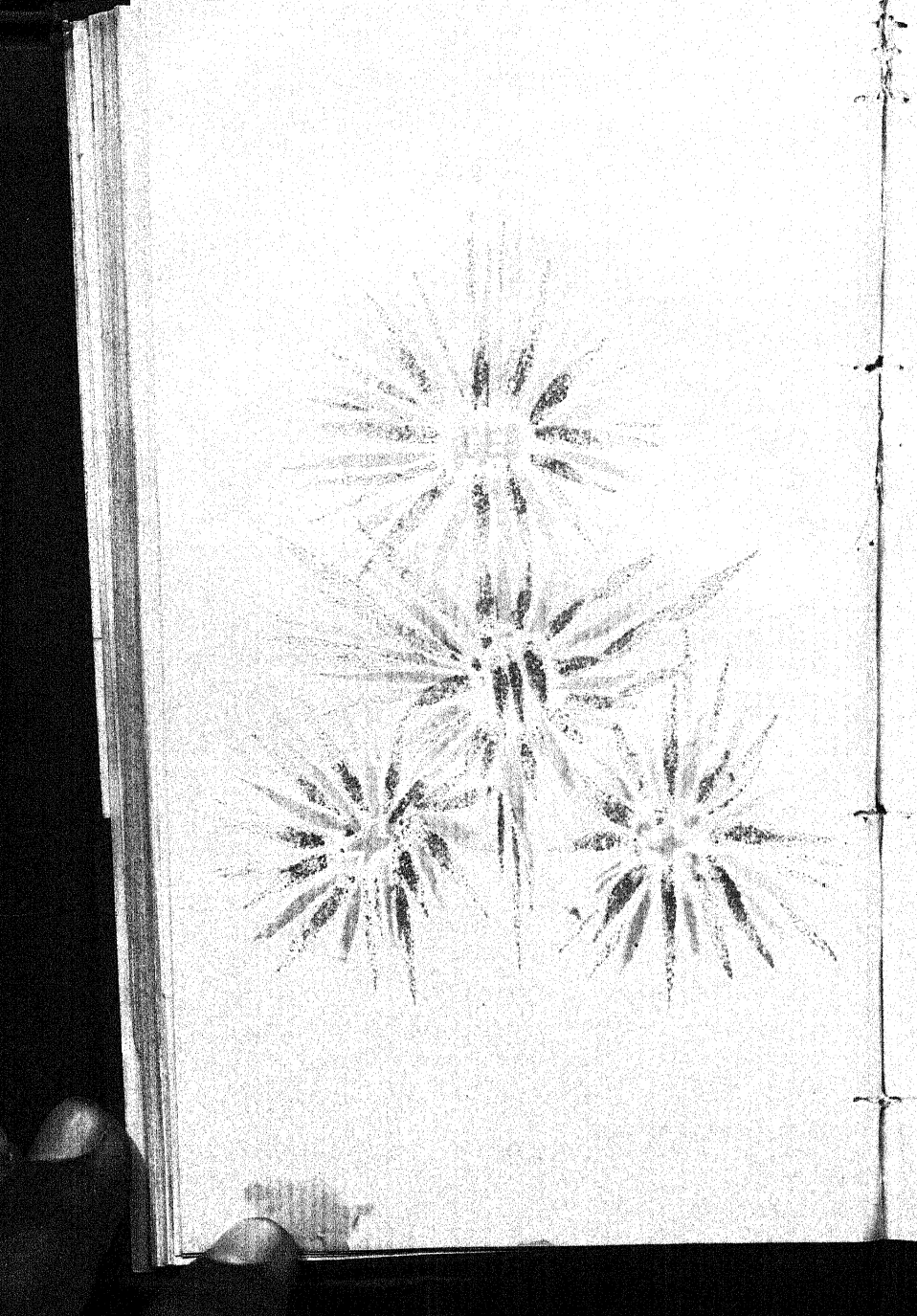
117. MADDER CARMINE,

Or *Field's Carmine*, is, as its name expresses, prepared from madder. It differs from the rose lakes of madder principally in texture, and in the greater richness, depth, and transparency of its colour, which is of various hues from rose colour to crimson. These in other respects resemble the rubrick or madder lakes, and are the only *durable carmines* for painting either in water or oil; for both which their texture qualifies them without previous grinding or preparation.

118. ROSE PINK

Is a coarse kind of lake, produced by dyeing chalk or whitening with decoction of Brazil wood, &c. It is a pigment much used by paper-stainers, and in the commonest distemper painting, &c., but is too perishable to merit the attention of the artist.





Chapter X.

OF BLUE.

119. The third and last of the primary, or simple colours, is *blue*, which bears the same relation to shade that yellow does to light; hence it is the most retiring and diffusive of all colours, except purple and black: and all colours have the power of throwing it back in painting, in greater or less degree, in proportion to the intimacy of their relations to light; first white, then yellow, orange, red, &c.

120. Blue alone possesses entirely the quality technically called *coldness* in colouring, and it communicates this property variously to all other colours with which it happens to be compounded. It is most powerful in a strong light, and appears to become neutral and pale in a declining light, owing to its ruling affinity with black or shade, and its power of absorbing light: hence the eye of the artist is liable to be deceived when painting with blue in too low a light, or toward the close of day, to the endangering of the warmth and harmony of his work.

121. Blue mixed with yellow forms *greens*, and mixed with red it forms *purples*; it characterizes the tertiary *olive*, and is also the prime colour of the neutral *black*, &c., and also of the semi-neutral *greys, slate, lead colours*, &c.: hence blue is changed in hue less than any colour by mixture with black, as it is also by distance. It enters also subordinately into all other tertiary and broken colours, and, as nearest in the scale to black, it breaks and contrasts powerfully and agreeably with white, as in watchet or pale

blues, the sky, &c. It is less active than the other primaries in reflecting light, and therefore sooner disappears by distance. It is an ancient doctrine that the azure of the sky is a compound of light and darkness, and some have argued hence that blue is not a primary colour, but a compound of black and white; but pure or *neutral* black and white compound in infinite shades, all of which are neutral also, or *grey*. It is true that a mixture of black and white is of a *cool* hue, because black is not a primary colour, but a compound of the three primary colours in which blue predominates, and this predominance is rendered more sensible when black is diluted with white.

122. Blue is discordant in juxtaposition with green, and in a less degree so with purple, both which are cool colours, and therefore *blue* requires its contrast, *orange*, in equal proportion, either of surface or intensity, to compensate or resolve its dissonances and correct its coldness. Botanists remark that blue flowers are much more rare than those of the other primary colours and their compounds, and hence advise the florist to cultivate blue flowers more sedulously: but in this they are opposed to nature, who has bestowed this colour principally upon noxious plants, and been more sparing of it in decorating the green hues of foliage; for green and blue alone in juxtaposition are discordant. Artists, too, have sometimes acted upon this principle of the botanist in introducing blue flowers into pictures, preferring therein rareness and novelty to truth and harmony: the artist has, however, more command of his materials than the botanist in resolving a discord;—Nature nevertheless left to herself, is not long in harmonizing the

dissonances men put upon her. Florists may further remark, that *blue flowers* are readily changed by cultivation into red and white, but never into yellow; that *yellow flowers* are as readily converted into red and white, but never into blue; and that *red flowers* are changeable into orange or purple, but never into blue or yellow: the reason of all which is apparent according to our principles: Nature also regulates the variegation of flowers by the same law of colouring.

123. Of all colours, except black, blue contrasts white most powerfully. In all harmonious combinations of colours, whether of mixture or neighbourhood, blue is the natural, ruling tone, universally agreeable to the eye when in due relation to the composition, and may be more frequently repeated therein, pure or unbroken, than either of the other primaries. These are, however, matters of taste, as in music, and subject to artificial rules founded on the laws of chromatic combination.

124. As blue cannot be composed by mixture of other colours it is an original and primary colour. The paucity of blue pigments, in comparison with those of yellow and red, is amply compensated by their value and perfection; nor is the palette without novelty, nor deficient in pigments of this colour: of which the following comprise all that are in any respect of importance to the painter.

125. ULTRAMARINE,

Or *Azure*, is prepared from the lapis lazuli, a precious stone found principally in Persia and Siberia. It is the most celebrated of all modern pigments, and, from its name and

attributes, is probably the same as the no less celebrated *Armenian blue*, or *Cyanus*, of the ancients.

126. Ultramarine has not obtained its reputation upon slight pretensions, being, when skilfully prepared, of the most exquisitely beautiful blue, varying from the utmost depth of shadow to the highest brilliancy of light and colour, —transparent in all its shades, and pure in its tints. It is of a true medial blue, when perfect, partaking neither of purple on the one hand, nor of green on the other: it is neither subject to injury by damp and impure air, nor by the intensest action of light; and it is so eminently permanent that it remains perfectly unchanged in the oldest paintings; and there can be little doubt that it is the same pigment which still continues with all its original force and beauty in the temples of Upper Egypt, after an exposure of at least three thousand years. The ancient Egyptians had however other blues, of which we have already mentioned their counterfeit Armenian blue, and several vitreous blues, with which they decorated their figures and mummies.

127. Ultramarine dries well, works well in oil and fresco, and neither gives nor receives injury from other good pigments. It has so much of the quality of light in it, and of the tint of air,—is so purely a sky colour, and is hence so singularly adapted to the direct and reflex light of the sky, and to become the antagonist of sunshine,— that it is indispensable to the landscape-painter; and it is so pure, so true, and so unchangeable in its tints and glazings, as to be no less essential in imitating the exquisite colouring of nature in flesh and flowers.

128. To this may be added, that it enters so admirably

into purples, blacks, greens, greys, and broken colours, that it has justly obtained the reputation of clearing or carrying light and air into all colours both in mixture and glazing, and a sort of claim to universality throughout a picture.

It is true, nevertheless, that ultramarine is not always entitled to the whole of this commendation, being, as a precious material, subjected to *adulteration;* and it has been dyed, damped, and oiled to enrich its appearance; but these attempts of fraud may be easily detected, and the genuine may as easily be distinguished from the spurious by dropping a few particles of the pigment into lemon-juice, or any other acid, which almost instantly destroys the colour of the true ultramarine totally, and without effervescence.

129. Though unexceptionable as an oil-colour, both in solid painting and glazing, it does not work so well as some other blues in water; but when extremely fine in texture, or when a considerable portion of gum, which renders it transparent, can be used with it to give it connection or adhesion while flowing, it becomes a pigment no less valuable in water painting than in oil; but little gum can however be employed with it when its vivid azure is to be preserved, as in illuminated manuscripts and missals.

Pure ultramarine varies in shade from light to dark, and in hue from pale warm azure to the deepest cold blue; the former of which, when impure in colour, is called *ultramarine ashes.*

130. FACTITIOUS ULTRAMARINE,

French and *German Ultramarine*, a variety of these, English, French, and German, have been before the public under various names. They are in general of deep rich blue colours, darker and less azure than fine ultramarine of the same depths, and answer to the same acid test, but are variously affected by fire and other agents: none of them, however, possess the merits of genuine ultramarine. Fire generally darkens these colours, but the best way of distinguishing factitious ultramarine from the natural is by the violent effervescence of the former when dropped into nitrous acid. They may be regarded as a great improvement upon the factitious blues of the palette, rivalling in depth, although not equalling in colour, the pure azure of genuine ultramarine, for which in some uses they may be substituted, and are a valuable acquisition in decoration where brilliancy is required—and in printing.

131. COBALT BLUE

Is the name now appropriated to the modern improved blue prepared with metallic cobalt, or its oxides, although it properly belongs to a class of pigments including *Saxon blue, Dutch ultramarine, Thenard's blue, Royal blue, Hungary blue, Smalt, Zaffre* or *Enamel blue*, and *Dumont's blue*. These differ principally in their degrees of purity, and the nature of the earths with which they are compounded.

132. The first is the finest cobalt blue, and may not improperly be called a blue lake, the colour of which is brought up by fire, in the manner of enamel blues; and it

is, when well prepared, of a pure blue colour, neither tending to green nor purple, and approaching in brilliancy to the finest ultramarine. It has not, however, the body, transparency, and depth, nor the natural and modest hue, of the latter; yet it is superior in beauty to all other blue pigments. Cobalt blue works better in water than ultramarine in general does; and is hence an acquisition to those who have not the management of the latter, and also on account of its cheapness. It resists the action of strong light and acids; but its beauty declines by time, and impure air.

It dries well in oil, does not injure or suffer injury from pigments in general, and may be used with a proper flux in enamel painting, and perhaps also in fresco.

Various appellations have been given to this pigment from its preparers and venders, and it has been called *Vienna blue, Paris blue, azure,* and, very improperly, *ultramarine.*

133. SMALT,

Sometimes called *Azure,* is an impure vitreous cobalt blue, prepared upon a base of silex, and much used by the laundress for neutralizing the tawny or Isabella colour of linen, &c., under the name of *Powder-blue.* It is in general of a course gritty texture, light blue colour, and little body. It does not work so well as the preceding, but dries quickly, and resembles it in other respects;—it varies, however, exceedingly in its qualities; and the finer sorts, called *Dumont's blue,* which is employed in water-colour painting, is remarkably rich and beautiful.

134. ROYAL BLUE

s a deeper coloured and very beautiful smalt, and is also a vitreous pigment, principally used in painting on glass and enamel, in which uses it is very permanent; but in water and oil its beauty soon decays, as is no uncommon case with other vitrified pigments; and it is not in other respects an eligible pigment, being, notwithstanding its beautiful appearance, very inferior to other cobalt blues.

135. PRUSSIAN BLUE,

Otherwise called *Berlin blue, Parisian blue, Prussiate of Iron,* or *Cyanide of Iron,* is rather a modern pigment, produced by the combination of the prussic or hydro-cyanic acid, iron, and alumina. It is of a deep and powerful blue colour, of vast body and considerable transparency, and forms tints of much beauty with white lead, though they are by no means equal in purity and brilliancy to those of cobalt and ultramarine, nor have they the perfect durability of the latter.

136. Notwithstanding Prussian blue lasts a long time under favourable circumstances, its tints fade by the action of strong light, and it is purpled or darkened by damp or impure air. It becomes greenish also sometimes by a development of the yellow oxide of iron. The colour of this pigment has also the singular property of fluctuating, or of going and coming, under some changes of circumstances; which property it owes to the action and reaction by which it acquires and relinquishes oxygen alternately: and time has a neutralizing tendency upon its colour.

It dries and glazes well in oil, but its great and principal use is in painting deep blues; in which its body secures its permanence, and its transparency gives force to its depth. It is also valuable in compounding deep purples with lake, and is a powerful neutralizer and component of black, and adds considerably to its intensity. It is a pigment much used when mixed with white lead in the common offices of painting, also in preparing blues for the laundress, in dyeing, and in compounding colours of various denominations. *Lime* and *Alkalis* injure or destroy this colour.

137. ANTWERP BLUE

Is a lighter-coloured and somewhat brighter Prussian blue, or ferro-prussiate of alumine, having more of the terrene basis, but all the other qualities of that pigment, except its extreme depth. *Haerlem Blue* is a similar pigment.

138. INDIGO,

Or *Indian Blue*, is a pigment manufactured in the East and West Indies from several plants, but principally from the anil or indigofera. It is of various qualities, and has been long known, and of great use in dyeing. In painting it is not so bright as Prussian blue, but is extremely powerful and transparent; hence it may be substituted for some of the uses of Prussian blue as the latter now is for indigo. It is of great body, and glazes and works well both in water and oil. Its relative permanence as a dye has obtained it a false character of extreme durability in painting, a quality in which it is nevertheless very inferior even to Prussian blue.

It is injured by impure air, and in glazing some specimens are firmer than others, but not durable; in tint with white lead they are all fugitive: when used, however, in considerable body in shadow, it is more permanent, but in all respects inferior to Prussian blue in painting. *Intense blue* is indigo refined by solution and precipitation, in which state it is equal in colour to Antwerp blue. By this process indigo also becomes more durable, and much more powerful, transparent, and deep. It washes and works admirably in water: in other respects it has the common properties of indigo. We have been assured by an eminent architect, that these blues of indigo have the property of pushing or detaching Indian ink from paper. The same is supposed to belong to other blues; but as this effect is chemical, it can hardly be an attribute of mere colour.

139. BLUE VERDITER

Is a blue oxide of copper, or precipitate of the nitrate of copper by lime, and is of a beautiful light blue colour. It is little affected by light; but time, damp, and impure air turn it green, and ultimately blacken it,—changes which ensue even more rapidly in oil than in water: it is therefore by no means an eligible pigment in oil, and is principally confined to distemper painting and the uses of the paper-stainer, though it has been found to stand well many years in water-colour drawings and in crayon paintings, when preserved dry. It has been improperly substituted for *Bice*.

140. SAUNDERS BLUE,

A corrupt name, from *Cendres Bleus*, the original denomination probably of *ultramarine ashes*, is of two kinds, the natural and the artificial; the artificial is a verditer prepared by lime or an alkali from nitrate or sulphate of copper; the natural is a blue mineral found near copper-mines, and is the same as *Mountain Blue*. A very beautiful substance of this kind, a *carbonate of copper*, both blue and green, is found in Cumberland. None of these blues of copper are, however, durable: used in oil, they become green, and, as pigments, are precisely of the character of verditers. *Schweinfurt Blue* is a similar pigment.

141. BICE,

Blue Bice, *Iris*, or *Terre Blue*, is sometimes confounded with the above copper blues; but the true bice is said to be prepared from the *lapis Armenius* of Germany and the Tyrol, and is a light bright hue. The true Armenian stone of the ancients was probably the lapis lazuli of later times, and the blue prepared therefrom the same as our ultramarine. Pale ultramarine may well supply the place of this pigment, but copper blues substituted for this pigment are not to be depended on.

Ground smalts, blue verditer, and other pigments, have passed under the name of bice; which has, therefore, become a very equivocal pigment, and its name nearly obsolete: nor is it at present to be found in the shops, although much commended by old writers on the art.

Chapter XI.

OF THE SECONDARY COLOURS.

OF ORANGE.

142. Orange is the first of the secondary colours in relation to light, being in all the variety of its hues composed of *yellow* and *red*. A true or perfect orange is such a compound of red and yellow as will neutralize a perfect blue in equal quantity either of surface or intensity, and the proportions of such compound are five of perfect red to three of perfect yellow. When orange inclines to red, it takes the names of *scarlet, poppy, coquilicot*, &c. In *gold* colour, &c., it leans toward yellow. It enters into combination with green in forming the tertiary *citrine*, and with purple it constitutes the tertiary *russet*: it forms also a series of warm semi-neutral colours with *black*, and harmonizes in contact and variety of tints with *white*.

143. Orange is an advancing colour in painting:—in nature it is effective at a great distance, acting powerfully on the eye; diminishing its sensibility in proportion to the strength of the light in which it is viewed; and it is of the hue and partakes of the vividness of sunshine, as it does also of all the powers of its components, red and yellow.

144. This secondary is pre-eminently a *warm* colour, being the equal contrast or antagonist in this respect, as it is also in colour, to blue, to which the attribute of *coolness* peculiarly belongs: hence it is discordant when stand-

ing alone with yellow or with red, unresolved by their proper contrasts.

In the well-known fruit of the Aurantium, called *orange* from its golden hue, from which fruit this colour borrows its well-adapted name, nature has associated two primary colours with two primary tastes which seem to be analogous; a red and yellow compound colour, with a sweet and acid compound flavour.

145. The poets confound orange with its ruling colour yellow, and, by a metonymy, use in its place the terms golden, gilding, &c., as gilding sometimes supplies the place of this colour in painting.

The list of original orange pigments is so deficient, that in some treatises, orange is not even named as a colour, most of them being called reds or yellows: and orange being a colour compounded of red and yellow, the place of original orange pigments may be supplied by mixture of the two latter colours; by glazing one over the other; by stippling, or other modes of breaking and intermixing them in working, according to the nature of the work and the effect required. For reasons before given, mixed pigments are inferior to the simple or homogeneous in colour, working, and other properties: yet some pigments mix and combine more cordially than others. In oil the compounding of colours is more easily effected.

146. CHROME ORANGE

Is a beautiful orange pigment, and is one of the most durable and least exceptionable chromates of lead, and not of iron, as it is commonly called, or *Mars Scarlet*, another

misnomer of this pigment, which is truly a subchromate of lead.

It is, when well prepared, of a brighter colour than vermilion, but is inferior in durability and body to the latter pigment, being liable to the changes and affinites of the chrome yellows in a somewhat less degree, but less liable to change than the orange oxide of lead. *Laque Mineral*, is a French pigment, a species of chromic orange, similar to the above. This name is also given to orange oxide of iron, and *Chromate of Mercury*, which is improperly classed as a red with vermilion, for though it is of a bright ochrous red colour in powder, it is, when ground, of a bright orange ochre colour, and affords, with white, very pure orange-coloured tints. Nevertheless it is a bad pigment, since light soon changes it to a deep russet colour, and foul air reduces it to extreme blackness.

147. ORANGE OCHRE,

Called also *Spanish ochre*, &c., is a very bright yellow ochre burnt, by which operation it acquires warmth, colour, transparency, and depth. In colour it is moderately bright, forms good flesh tints with white, dries and works well both in water and oil, and is a very durable and eligible pigment. It may be used in enamel-painting, and has all the properties of its original ochre in other respects.

148. MARS ORANGE

Is an artificial iron ochre, similar to the above, of which we formerly prepared a variety brighter, richer, and more transparent than the above, and in other respects of the

same character; but requiring to be employed cautiously with colours affected by iron, being more chemically active than native ochres, several of which and their compounds become orange by burning.

149. BURNT SIENNA EARTH

Is, as its name expresses, the *Terra di Sienna* burnt, and is of an orange russet colour. What has been said of orange ochre may be repeated of burnt Sienna earth. It is richer in colour, deeper, and more transparent, and works and dries better than *raw Sienna earth;* but in other respects has all the properties of its parent colour, and is permanent and eligible wherever it may be useful, and valuable in graining. *Light Red* and *Venetian Red,* before treated of, are also to be considered as impure, but durable orange colours; and several artificial preparations of iron afford excellent colours of this class.

150. ORANGE LEAD

Is an oxide of lead of a more vivid and warmer colour than *red lead,* but in other respects does not differ essentially from that pigment in its qualification for the palette.

151. ORANGE ORPIMENT,

Or *Realgar,* improperly called also *Red orpiment,* since it is of a brilliant orange colour, inclining to yellow. There are two kinds of this pigment; the one *native,* the other *factitious;* the first of which is the *sandarac* of the ancients, and is of rather a redder colour than the factitious. They are the same in qualities as pigments, and differ not

otherwise than in colour from *yellow orpiment*, to which the old painters gave the orange hue by heat, and then called it *alchymy*, and *burnt orpiment*.

152. ANTIMONY ORANGE

Is a *hydro-sulphuret of antimony* of an orange colour, which is destroyed by the action of strong light. It is a bad dryer in oil, injurious to many colours, and in no respect an eligible pigment either in oil or water.

153. ANOTTA,

Arnotta, Annotto, Caruera, Chica, Terra Orleana, Roucou, &c., are names of several vegetal substances brought from the West Indies, of an orange red colour, soluble in water and spirit of wine, but very fugitive and changeable, and not fit-for painting. It is principally used by the dyer, and in colouring cheese. It is also an ingredient in some lackers.

Chapter XII.

OF GREEN.

154. Green, which occupies the middle station in the natural scale of colours and in relation to light and shade, is the second of the secondary colours: it is composed of the extreme primaries, *yellow* and *blue*, and is most perfect in hue when constituted in the proportions of *three* of

yellow to *eight* of blue of equal intensities; because such a green will perfectly neutralize and contrast a perfect red in the proportions of *eleven* to *five* either of space or power, as adduced on our scale of Chromatic Equivalents. Of all compound colours, green is the most effective, distinct, and striking, affecting the mind with surprise and delight when first produced by the mixture of blue and yellow: so dissimilar to its constituents does it appear to the untutored eye. Green, mixed with orange, converts it into the one extreme tertiary, *citrine;* and, mixed with purple, it becomes the other extreme tertiary, *olive:* hence its relations and accordances are more general, and it contrasts more agreeably with all colours than any other individual colour. It has, accordingly, been adopted with perfect wisdom in nature as the general garb of the vegetal creation. It is, indeed, in every respect a central or middle colour, being the contrast and compensatory of the middle primary, *red,* on the one hand, and of the middle tertiary, *russet,* on the other: and, unlike the other secondaries, all its hues, whether tending to blue or yellow, are of the same denomination.

155. These attributes of green, which render it so universally effective in contrasting of colours, cause it also to become the least useful in compounding them, and the most apt to defile other colours in mixture: nevertheless it forms valuable semi-neutrals of the *olive* class with *black,* for of such subdued tones are the greens, by which the more vivid hues of nature are contrasted; accordingly the various greens of foliage are always more or less semi-neutral in colour, declining into *grey.* As *green* is the most

general colour of vegetal nature, and principal in foliage; so *red*, its harmonizing colour, and compounds of red, are most general and principal in flowers. *Purple* flowers are commonly contrasted with centres or variegations of bright *yellow*, as *blue* flowers are with like relievings of *orange*; and there is a prevailing hue, or character, in the green colour of the foliage of almost every plant, by which it is harmonized with the colours of its flowers.

156. The principal discord of green is blue; and when they approximate or accompany each other, they require to be resolved by the apposition of warm colours; and it is in this way that the warmth of distance and the horizon reconcile the azure of the sky with the greenness of a landscape. Its less powerful discord is yellow, which requires to be similarly resolved by a purple-red, or its principles. In its tones green is cool or warm, sedate or gay, either as it inclines to blue or to yellow; yet it is in its general effects cool, calm, temperate, and refreshing; and, having little power in reflecting light, is in a mean degree, a retiring colour, and readily subdued by distance; for the same reasons it excites the retina less than most colours, and is cool and grateful to the eye. As a colour individually, green is eminently beautiful and agreeable, but it is more particularly so when contrasted with its compensating colour, red, as it often is in nature, and even in the green leaves and the young shoots of plants and trees; and they are the most generally attractive of all colours in this respect. They are hence powerful and effective colours on the feelings and passions, and require, therefore, to be subdued or toned to prevent excitement and to preserve the balance of harmony in painting.

The number of pigments of any colour is in general proportioned to its importance; hence the variety of greens is very great, though their classes are not very numerous. The following are the principal:—

157. MIXED GREENS.

Green being a compound of *blue* and *yellow*, pigments of these colours may be used to supply the place of green pigments, by compounding them in the several ways of working; by mixing, glazing, hatching, or otherwise blending them in the proportions of the hues and tints required. In compounding colours, it is desirable not only that they should agree chemically, but that they should also have, as much as may be, the same degree of durability; and in these respects Prussian or Antwerp blue and gamboge form a judicious, though not extremely durable, compound, similar to *Varley's green, Hooker's green,* &c., used in water. In common oil painting greens are formed by mixture of the ordinary blue and yellow pigments with additions of white. But these are less durable than the original green pigments prepared from copper, of which there are a great variety. But the yellow ochres with Prussian blue afford more eligible pigments than the brighter mixtures of chrome yellow afford. *Cobalt greens, chrome greens,* and *Prussian green,* are names for similar mixtures.

158. TERRE-VERTE.

True Terre-Verte is an ochre of a bluish green not very bright, in substance moderately hard, and smooth in texture. It is variously a bluish or grey, coaly clay, combined with

yellow oxide of iron or yellow ochre. Although not a bright, it is a very durable pigment, being unaffected by strong light and impure air, and combining with other colours without injury. It has not much body, is semi-transparent, and dries well in oil. There are varieties of this pigment; but the green earths which have copper for their colouring matter are, although generally of brighter colours, inferior in their other qualities, and are not true terre-vertes.

It has been called *Green Bice*, and the greens called *Verona green*, and *Verdetto, or Holy green*, are similar native pigments of a warmer colour. These greens are found in the Mendip Hills, France, Italy, and the Island of Cyprus, and have been employed as pigments from the earliest times.

159. CHROME GREENS,

Commonly so called, are compound pigments, of which chrome yellow is the principal colouring substance. These are also called *Brunswick green*, &c., and are compounds of chromate of lead with Prussian and other blue colours, constituting fine greens to the eye, suitable to some of the ordinary purposes of mechanic art; but unfit for fine art.

There is, however, a true chrome green, or *Native green*, the colouring matter of which is the pure oxide of chrome; and, being free from lead, is durable both against the action of the sun's light and impure air. It is of various degrees of transparency or opacity, and of several hues more or less warm or cool, which are all rather fine than brilliant greens, and afford pure natural and durable tints. *True Chrome greens* neither give nor receive injury from other pigments,

and are eligible for either water or oil painting, in the latter of which they usually dry well. They afford valuable colours also in enamel painting. To this substance it is that the emerald owes its green colour.

160. COBALT GREENS.

There are two pigments of this denomination, the one a compound of cobalt blue and chromic yellow, which partakes of the qualities of those pigments, and may be formed by mixture,—the other, an original pigment prepared immediately from cobalt, with addition of oxide of iron or zinc, which is of a pure but not very powerful green colour, and durable both in water and oil, in the latter of which it dries well. *Rinmann's green* is of this kind. Its habits are nearly the same as those of Cobalt blue.

161. COPPER GREEN

Is the appellation of a class rather than of an individual pigment, under which are comprehended *Verdigris, Verditer, Malachite, Mineral green, Green Bice, Scheele's green, Schweinfurt* or *Vienna green, Hungary green, Emerald green,* true *Brunswick green, green Lake, Mountain green, African green, French green, Saxon green, Persian green, Patent green, Marine green, Olympian green,* &c. Old authors mention others under the names of individuals who prepared them, such are Verde de Barildo, &c.

The general characteristics of these greens are brightness of colour, well suited to the purposes of house-painting, but not in general adapted to the modesty of nature in fine art. They have considerable permanence, except from the

action of damp and impure air, which ultimately blacken them: to which they have also a tendency by time. They have a good body, and dry well in oil, but, like the whites of lead, are all deleterious substances. We will particularize the principal sorts.

162. VERDIGRIS,

Or *Viride Æris*, is of two kinds, common or impure, and crystallized or *Distilled Verdigris*, or more properly refined verdigris. They are both acetates of copper, of a bright colour inclining to blue. They are the least permanent of the copper greens, soon fading as water-colours by the action of light, &c., and becoming first white, and ultimately black, by damp and foul air. In oil, verdigris is durable with respect to light and air, but moist and impure air change its colour, and cause it to effloresce or rise to the surface through the oil. It dries rapidly, and might be useful as a siccific with other greens or very dark colours. Fresh ground in varnish it stands better; but is not upon the whole a safe or eligible pigment, either alone or compounded. Vinegar dissolves it, and the solution is used for tinting maps, &c. The addition of refined sugar, with gentle boiling, facilitates the solution and improves the colour.

163. GREEN VERDITER

Is the same in substance as blue verditer, which is converted into green verditer by boiling. This pigment has the common properties of the copper greens above mentioned, and is sometimes called *Green Bice*.

164. EMERALD GREEN

Is the name of a new copper green upon a terrene base. It is the most vivid of this tribe of colours, being rather opaque, and powerfully reflective of light, and appears to be the most durable pigment of its class. Its hue is not common in nature, but well suited for brilliant works. It works well in water, but difficultly in oil, and dries badly therein. The only true emerald green is, however, that of chrome, with which metal nature gives the green colour to the emerald.

165. MINERAL GREEN

Is the commercial name of *Green Lakes*, prepared from the sulphate of copper. These vary in hue and shade, have all the properties before ascribed to copper greens, and afford the best common greens; and, not being liable to change of colour by oxygen and light, stand the weather well, and are excellent for the use of the house-painter, &c.: but are less eligible in the nicer works of fine art, having a tendency to darken by time and foul air.

166. MOUNTAIN GREEN

Is a native carbonate of copper, combined with a white earth, and often striated with veins of mountain blue, to which it bears the same relation that green verditer does to blue verditer: nor does it differ from these and other copper greens in any property essential to the painter. The *Malachite*, a beautiful copper ore, employed by jewellers, is sometimes called mountain green, and *Green bice* is also con-

founded therewith, being similar substances and of similar use as pigments. It is also called *Hungary green*, being found in the mountains of Kernhausen, as it is also in Cumberland.

167. SCHEELE'S GREEN

Is a compound oxide of copper and arsenic, or arsenite of copper, named after the justly celebrated chemist who discovered it. It is variously of a beautiful, light, warm, green colour, opaque, permanent in itself and in tint with white lead, but must be used cautiously with Naples yellow, by which it is soon destroyed. *Schweinfurt green* and *Vienna green* are also names of a fine preparation of the same kind as the above. These pigments are less affected by damp and impure air than the simple copper greens, and are therefore in these respects rather more eligible colours than the ordinary copper greens.

168. PRUSSIAN GREEN.

The pigment celebrated under this name is an imperfect prussiate of iron, or Prussian blue, in which the yellow oxide of iron superabounds, or to which yellow tincture of French berries has been added, and is not in any respect superior as a pigment to the compounds of Prussian blue and yellow ochre. A better sort of Prussian green is formed by precipitating the prussiate of potash with nitrate of cobalt.

169. SAP GREEN,

Or *Verde Vessie*, is a vegetal pigment prepared from the

juice of the berries of the buckthorn, the green leaves of the woad, the blue flowers of the iris, &c. It is usually preserved in bladders, and is thence sometimes called *Bladder Green;* when good it is of a dark colour and glossy fracture, extremely transparent, and of a fine natural green colour. Though much employed as a water-colour without gum, which it contains naturally, it is a very imperfect pigment, disposed to attract the moisture of the atmosphere, and to mildew; and, having little durability in water-colour painting, and less in oil, it is not eligible in the one, and is totally useless in the other.

Similar pigments, prepared from coffee-berries, and called *Venetian* and *Emerald greens,* are of a colder colour, very fugitive, and equally defective as pigments.

170. INVISIBLE GREEN.

A good ordinary green of this denomination, for out-of-door painting and fresco, may be prepared by mixture of the yellow ochres with black in small quantities; or by adding black to any of the ordinary green pigments. See *Olive Pigments.*

Chapter XIII.

OF PURPLE.

171. Purple, the third and last of the secondary colours, is composed of *red* and *blue,* in the proportions of five of the former to eight of the latter, which constitute a

perfect purple, or one of such a hue as will neutralize, and best contrast a perfect yellow in the proportions of thirteen to three, either of surface or intensity. It forms, when mixed with its co-secondary colour, green, the tertiary colour, *olive;* and, when mixed with the remaining secondary orange, it constitutes in like manner the tertiary colour, *russet.* It is the coolest of the three secondary colours, and the nearest also in relation to *black* or shade; in which respect, and in never being a warm colour, it resembles blue. In other respects also purple partakes of the properties of blue, which is its ruling colour; hence it is to the eye a most retiring colour, which reflects light little, and declines rapidly in power in proportion to the distance at which it is viewed, and also in a declining light. It is the most retiring of positive colours.

172. Next to green, purple is the most generally pleasing of the consonant colours; and has been celebrated as a regal or imperial colour, as much perhaps from its rareness in a pure state, as from its individual beauty. When inclining to the rose, or red, this colour takes the names of *crimson,* &c., as it does those of *violet, lilac,* &c., when it inclines toward its other constituent, blue; which latter colour it serves to mellow, or follows well into shade.

173. The contrast, or harmonizing colour of purple, is yellow on the side of light and the primaries; and it is itself the harmonizing contrast of the tertiary *citrine* on the side of shade, and less perfectly so of the semi-neutral *brown.* Purple, when inclining towards redness, is a regal, magisterial, and pompous colour. In its effects on the mind it partakes principally, however, of the powers of its archeus, or ruling colour, blue.

174. As the extreme primaries, blue and yellow, when either compounded or opposed, afford the most pleasing consonance of the primary colours; so the extremes, purple and orange, afford the most pleasing of the secondary consonances; and this analogy extends also to the extreme tertiary and semi-neutral colours, while the mean or middle colours afford the most agreeable contrasts or harmonies. Purple pigments are rare, and lie under a peculiar disadvantage as to apparent durability and beauty of colour, owing to the neutralizing power of yellowness in the grounds upon which they are laid, as well as to the general warm colour of light, and the yellow tendency of almost all vehicles and varnishes, by which this colour is subdued; for the same reason this colour disappears by candle-light.

175. MIXED PURPLES.

Purple being a secondary colour, composed of *blue* and *red*, it follows of course that any blue and red pigments, which are not chemically at variance, may be used in producing mixed purple pigments of any required hue, either by compounding or grinding them together ready for use, or by combining them in the various modes of operation in painting. In such compounding, the more perfect the original colours are, the better in general will be the purple produced. In these ways, *ultramarine* and the *rose colours of madder* constitute excellent and beautiful purples, which are equally permanent in water and oil, in glazing, or in tint, whether under the influence of the oxygenous or the hydrogenous principles of light and impure air, by which colours are subject to change. The blue and red of cobalt and madder

afford also good purples. Some of the finest and most delicate purples in ancient paintings appear to have been similarly compounded of *ultramarine* and *vermilion*, which constitute tints equally permanent, but less transparent than the above. Facility of use, and other advantages, are obtained at too great a sacrifice by the employment of perishable mixtures, such as are the carmines and lakes of cochineal with *indigo and other blue colours*; but common purples may be composed of Prussian blue and vermilion with additions of white.

176. GOLD PURPLE,

Or *Cassius's Purple Precipitate*, is the compound oxide which is precipitated upon mixing the solutions of gold and tin. It is not a bright, but a rich and powerful colour, of great durability, varying in degrees of transparency, and in hue from deep crimson to a murrey or dark purple, and is principally used in miniature. It may be employed in enamel-painting, works well in water, and is an excellent though expensive pigment, but not much used at present, as the madder purple is cheaper, and perfectly well supplies its place.

177. MADDER PURPLE,

Purple Rubiate, or *Field's Purple*, is a very rich and deep carmine, prepared from madder. Though not a brilliant purple, its richness, durability, transparency, and superiority of colour, have given it the preference to the purple of gold preceding, and to burnt carmine. It is a pigment of great body and intensity; it works well, dries and glazes

well in oil, and is pure and permanent in its tints, neither giving nor sustaining injury from other colours.

178. BURNT CARMINE

Is, according to its name, the carmine of cochineal partially charred till it resembles in colour the purple of gold, for the uses of which in miniature and water-painting it is substituted, and has the same properties except its durability; of which quality, like the carmine it is made from, it is deficient, and therefore in this important respect is an ineligible pigment. A durable colour of this kind may, however, be obtained by burning *madder carmine* in a cup over a spirit lamp, or otherwise stirring it till it becomes of the hue or hues required.

179. PURPLE LAKE.

The best purple lake so called is prepared from cochineal, and is of a rich and powerful colour, inclined to crimson. Its character as a pigment is that of the cochineal lakes already described. It is fugitive both in glazing and tint; but, used in considerable body, as in the shadows of draperies, &c., it will last under favourable circumstances a long time. Lac lake resembles it in colour, and may supply its place more durably, although not perfectly so.

180. PURPLE OCHRE,

Or *Mineral Purple*, is a dark ochre, native of the Forest of Dean in Gloucestershire. It is of a murrey or chocolate colour, and forms cool tints of a purple hue with white. It is of a similar body and opacity, and darker colour than *Indian*

red, which has also been classed among purples, but in all other respects it resembles that pigment. It may be prepared artificially, and some natural red ochres burn to this colour, which has been employed under the denomination of *Violet de Mars*.

Chapter XIV.

OF THE TERTIARY COLOURS.

OF CITRINE.

181. Citrine, is the first of the tertiary class of colours, or ultimate compounds of the primary triad, *yellow*, *red*, and *blue*; in which *yellow* is the predominating colour, and blue the extreme subordinate; for citrine being an immediate compound of the secondaries, *orange* and *green*, of both which *yellow* is a constituent, the latter colour is of double occurrence therein, while the other two primaries enter singly into the composition of citrine,—its mean or middle hue comprehending eight blue, five red, and six yellow, of equal intensities.

182. Hence citrine, according to its name, which is the name of a class of colours, and is used commonly for a dark yellow, partakes in a subdued degree of all the powers of its archeus, yellow; and, in estimating its properties and effects in painting, it is to be regarded as participating of all the relations of yellow. By some this

colour is improperly called brown, as almost all broken colours are. The harmonizing contrast of citrine is a *deep purple;* and it is the most advancing of the tertiary colours, or nearest in its relation to light. It is variously of a tepid, tender, modest, cheering character, and alike expressive of these qualities in painting and poetic art. In nature, citrine begins to prevail in landscape before the other tertiaries, as the green of summer declines; and as autumn advances it tends towards its orange hues, including the colours called aurora, chamoise, and others before enumerated under the head of Yellow.

183. To understand and relish the harmonious relations and expressive powers of the tertiary colours, requires a cultivation of perception and a refinement of taste to which study and practice are requisite. They are at once less definite and less generally evident, but more delightful, —more frequent in nature, but rarer in common art, than the like relations of the secondaries and primaries; and hence the painter and the poet afford us fewer illustrations of effects less commonly appreciated or understood.

Original citrine-coloured pigments are not numerous, unless we include several imperfect yellows, which might not improperly be called citrines: the following are, however, the pigments best entitled to this appellation:—

184. MIXED CITRINE.

What has been before remarked of the mixed secondary colours is more particularly applicable to the tertiary, it being more difficult to select three homogeneous substances, of equal powers as pigments, than two, that may unite and

work together cordially. Hence the mixed tertiaries are still less perfect and pure than the secondaries; and as their hues are of extensive use in painting, original pigments of these colours are proportionately estimable to the artist. Nevertheless, there are two evident principles of combination, of which the artist may avail himself in producing these colours in the various ways of working: the one being that of combining two original secondaries,—*e. g., green and orange* in producing a *citrine*; the other, the uniting the three primaries in such a manner that *yellow* predominate in the case of citrine, and *blue and red* be subordinate in the compound.

185. These colours are, however, in many cases produced with best and most permanent effect, not by the intimate combination of pigments but by intermingling them, in the manner of nature, on the canvass, so as to produce the effect at a proper distance of a uniform colour. Such is the *citrine* colour of fruit and foliage; on inspecting the individuals of which we distinctly trace the stipplings of orange and green, or yellow, red, and green. Similar beautiful consonances are observable in the *russet* hues of foliage in the autumn, in which purple and orange have broken or superseded the uniform green of leaves; and also in the *olive* foliage of the rose-tree, produced in the individual leaf by the ramification of purple in green. Yet mixed citrines may be compounded safely and simply by slight additions, to an original brown pigment, of that primary or secondary tone which is requisite to give it the required hue, and red and yellow ochres mixed form good common paints of this colour.

186. BROWN PINK

Is a vegetal lake precipitated from the decoction of French berries, and dyeing woods, and is sometimes the residuum of the dyer's vat. It is of a fine, rich, transparent colour, rarely of a true brown; but being in general of an orange broken by green, it falls into the class of citrine colours, sometimes inclining to greenness, and sometimes toward the warmth of orange. It works well both in water and oil, in the latter of which it is of great depth and transparency, but dries badly. Its tints with white lead are very fugitive, and in thin glazing it does not stand. Upon the whole, it is more beautiful than eligible.

187. UMBER,

Commonly called *Raw Umber*, is a natural ochre, abounding with oxide of manganese, said to have been first obtained from ancient Ombria, now Spoleto, in Italy;—it is found also in England, and in most parts of the world; but that which is brought from Cyprus, under the name of Turkish umber, is the best. It is of a brown-citrine colour, semi-opaque, has all the properties of a good ochre, is perfectly durable both in water and oil, and one of the best drying colours we possess, and injures no other good pigment with which it may be mixed. See *Cappagh Brown*, some specimens of which are of a citrine hue. Although not so much employed as formerly, umber is perfectly eligible according to its colour and uses, in graining, &c.

188. Several browns, and other ochrous earths, approach also to the character of citrines; such are the Terre

de Cassel, Bistre, &c. But in the confusion of names, infinity of tones and tints, and variations of individual pigments, it is impossible to attain an unexceptionable or universally satisfactory arrangement.

Chapter XV.

OF RUSSET.

189. The second or middle tertiary colour, *Russet*, like citrine, is constituted ultimately of the three primaries, *red*, *yellow*, and *blue*; but with this difference, that instead of yellow as in citrine, *red* is the predominating colour in russet, to which yellow and blue are subordinates: for *orange* and *purple* being the immediate constituents of russet, and red being a component part of each of those colours, it enters doubly into their compound in russet, while yellow and blue enter it only singly; the proportions of its middle hue being eight blue, ten red, and three yellow, of equal intensities. It follows that russet takes the relations and powers of a subdued red; and many pigments and dyes of the latter denomination are in strictness of the class of russet colours: in fact, nominal distinction of colours is properly only relative; the gradation from hue to hue, as from shade to shade, constituting an unlimited series, in which it is literally impossible to pronounce absolutely where any shade or colour ends and another begins.

190. The harmonizing, neutralizing, or contrasting

colour of russet, is a *deep green;*—when the russet inclines to orange, it is a *grey*, or subdued blue. These are often beautifully opposed in nature, being medial accordances, or in equal relation to light, shade, and other colours, and among the most agreeable to sense.

191. Russet, we have said, partakes of the relations of red, but moderated in every respect, and qualified for greater breadth of display in the colouring of nature and art; less so, perhaps, than its fellow-tertiaries in proportion as it is individually more beautiful, the powers of beauty being ever most effective when least obtrusive; and its presence in colour should be principally evident to the eye that seeks it. This colour is warm, complacent, solid, frank, and soothing. Common acceptation, substitutes the term brown for russet.

Of the tertiary colours, russet is the most important to the artist; and there are many pigments under the denominations of red, purple, &c., which are of russet hues. But there are few true russets, and one only which bears the name: of these are the following:—

192. MIXED RUSSET.

What has been remarked in the preceding chapter upon the production of mixed citrine colours, is equally applicable in general to the mixed russets: we need not, therefore, repeat it. By the immediate method of producing it materially from its secondaries, orange and purple ochres afford a compound russet pigment of a good and durable colour. Chrome-orange and purple-lake yield a similar but less permanent mixture.

Many other less eligible duple and triple compounds of russet are obvious upon principle, and it may be produced by adding red in due predominance to some browns; thus red and brown ochre duly mixed afford a good ordinary russet paint.

193. FIELD'S RUSSET,

Or *Madder Brown*, is, as its name indicates, prepared from the *rubia tinctoria*, or madder-root. It is of a pure, rich, transparent, and deep russet colour, introduced by the author, and is of a true middle hue between orange and purple; not subject to change by the action of light, impure air, time, or mixture of other pigments. It has supplied a great desideratum, and is indispensable in water-colour painting, both as a local and auxiliary colour, in compounding and producing with yellow the glowing hues of autumnal foliage, &c., and with blue the beautiful and endless variety of greys in skies, flesh, &c. There are three kinds of this pigment, distinguished by variety of hue: russet, or *madder brown*, *orange russet*, and dark russet, or *intense madder brown*; which differ not essentially in their qualities as pigments, but as warm or cool russets, and are all good glazing colours, thin washes of which afford pure flesh-tints in water. The last dries best in oil, the others but indifferently. It is a valuable pigment in the graining of mahogany.

194. PRUSSIATE OF COPPER

Differs chemically from Prussian blue only in having copper instead of iron for its basis. It varies in colour from

russet to brown, is transparent and deep, but, being very liable to change in colour by the action of light and by other pigments, has been very little employed by the artist.

There are several other pigments which enter imperfectly into, or verge upon, the class of russet, which, having obtained the names of other classes to which they are allied, will be found under other heads; such are some of the ochres and Indian red. Burnt carmine and Cassius's precipitate are often of the russet hue, or convertible to it by due additions of yellow or orange; as burnt Sienna earth and various browns are, by like additions of lake or other reds.

195. RUSSET OCHRE.

Although there is no pigment of this name in the shops, many of the native ochres are of this denomination of colour, and may be employed accordingly; and the red and yellow ochres of commerce ground together and burnt afford excellent russet colours in every mode of painting.

Chapter XVI.

OF OLIVE.

196. Olive is the third and last of the tertiary colours and nearest in relation to shade. It is constituted, like its co-tertiaries, citrine and russet, of the three primaries,

blue, red, and *yellow,* so subordinated, that blue prevails therein; but it is formed more immediately of the secondaries, *purple* and *green:* and, since blue enters as a component principle into each of these secondaries, it occurs twice in the latter mode of forming olive, while red and yellow occur therein singly and subordinately. *Blue* is, therefore, in every instance, the archeus, or predominating colour of olive; its perfect or middle hue comprehending SIXTEEN of blue to FIVE of red, and THREE of yellow; and it participates in a proportionate measure of the powers, properties, and relations of blue: accordingly, the antagonist, or harmonizing contrast of olive, is a *deep orange*; and, like blue also, it is a retiring colour, the most so of all the colours, being nearest of all in relation to *black,* and last of the regular distinctions of colours. Hence its importance in nature and painting is almost as great as that of black: it divides the office of clothing and decorating the general face of nature with green and blue; with both which, as with black and grey, it enters into innumerable compounds and accordances, changing its name, as either hue predominates, into *green, grey, ashen, slate,* &c.: thus the olive hues of foliage are called *green,* and the purple hues of clouds are called *grey,* &c., for language is general only, and inadequate to the infinite particularity of nature and colours.

197. As olive is usually a compound colour both with the artist and mechanic, and as there is no natural pigment in use under this name, or of this colour, in commerce there are few olive pigments. *Terre-vert,* already mentioned, is sometimes of this class, and several of the copper greens

acquire this hue by burning. The following need only to be noticed:—

198. MIXED OLIVE.

May be compounded in several ways; directly, by uniting *green* and *purple*, or by adding to *blue* a smaller proportion of *yellow* and *red*, or by breaking much blue with little orange. Cool black pigments mixed with yellow ochre, afford good olives. These hues are called *green* in landscape, and *invisible green* in mechanic painting.

199. OLIVE GREEN.

The fine pigment sold under this name, principally as a water-colour, is an arbitary compound, or mixed green, eligible for its uses. Any ordinary green mixed with black forms this colour for exterior painting in oil, &c. And an olive-green paint may be economically prepared by the mixing of yellow or brown ochre with black, which may be varied by additions of blue or green.

200. BURNT VERDIGRIS

Is what its name expresses, and is an olive-coloured oxide of copper deprived of acid. It dries remarkably well in oil, and is more durable; and, in other respects, an improved and more eligible pigment than the original verdigris. Scheele's green affords by burning also a series of similar olive colours, which are as durable as their original pigment, and most of the copper greens may be subjected to the same process with the same results: indeed we have remarked in many instances that the action of fire anticipates

the effects of long-continued time, and that many of the primary and secondary colours may by different degrees of burning, be converted into their analogous secondary and tertiary, or semi-neutral colours, that come usefully into the graining of rosewood, &c.

Chapter XVII.

OF SEMI-NEUTRAL COLOURS.

OF BROWN.

201. As colour, according to the regular scale descending from *white*, properly ceases with the class of *olive*, the neutral *black* would here naturally terminate the series; but as, in a practical view, every coloured pigment, of every class or tribe, combines with black as it exists in pigments, a new series or scale of coloured compounds arises, having black for their basis, which, though they differ not theoretically from the preceding order inverted, are nevertheless, practically imperfect or impure; in which view, and as compounds of black, we have distinguished them by the term *semi-neutral*, and divided them into three classes, Brown, Marrone and Grey. Inferior as the semi-neutrals are in point of colour, they comprehend, nevertheless, a great proportion of our most permanent pigments; and are, with respect to black, what *tints* are with respect to white; *i. e.*, they are, so to call them, black tints, or shades.

202. The first of the semi-neutrals, and the subject of

the present chapter, is BROWN, which, in its widest acceptation, has been used to comprehend vulgarly every denomination of dark broken colour, and in a more limited sense, is the rather indefinite appellation of a very extensive class of colours of warm or tawny hues. Accordingly we have browns of every denomination of colours except blue; thus we have yellow-brown, red-brown, orange-brown, purple-brown, &c.: but it is remarkable that we have, in this sense, no blue-brown nor any other coloured-brown, in any but a forced sense, in which blue predominates; such predominance of a cold colour immediately carrying the compound into the class of grey, ashen, or slate-colour. Hence brown comprehends the hues called feuillemort, mort d'ore, dun, hazel, auburn, &c.; several of which we have already enumerated as allied to the tertiary colours.

203. The term *brown*, therefore, properly denotes a warm, broken colour, of which *yellow* is a principal constituent: hence brown is in some measure to shade what yellow is to light, and warm or ruddy browns follow yellows naturally as shading or deepening colours. It is hence also that *equal quantities* of either of the three primaries, the three secondaries, or the three tertiaries, produce variously a brown mixture, and not the neutral black, &c.; because no colour is essentially single, and warmth belongs to two of the primaries, but coldness to blue alone. Browns contribute to coolness and clearness by contrast when opposed to pure colours. Hence their vast importance in painting and the necessity of keeping them from other colours, to which they give foulness in mixture.

204. The tendency in the compounds of colours to run

into brownness and warmth is one of the general natural properties of colours, which occasions them to deteriorate or dirt each other in mixture: hence *brown* is synonymous with foul or defiled, in a sense opposed to *fair* and pure; and it is hence also that brown, which is the nearest of the semi-neutrals in relation to light, is to be avoided in mixture with light colours.

This tendency will account also for the use of brown in harmonizing and toneing, and for the great number of natural and artificial pigments and colours we posses under this denomination: in fact, the failure to produce other colours chemically or by mixture is commonly productive of a brown: yet are fine transparent browns obviously very valuable colours. If red or blue be added to brown predominantly, it falls into the other semi-neutral classes, marrone or grey.

205. The wide acceptation of the term brown has occasioned much confusion in the naming of colours, since broken colours in which red, &c., predominate have been improperly called brown; and a tendency to red or hotness in browns obtains for them the reproachful appellation of *foxiness*. This term, brown, should therefore be confined to the class of semi-neutral colours compounded of, or of the hues of, either the *primary yellow, the secondary orange, or the tertiary citrine, with a black pigment;* the general contrast or harmonizing colour of which will consequently be more or less purple or grey; and with reference to black and white, or light and shade, it is of the semi-neutrals the nearest in accordance with white and light.

206. Brown is a sober and sedate colour, grave and

solemn, but not dismal, and contributes to the expression of strength, stability, and solidity, vigour, and warmth, and in minor degree to the serious, the sombre, and the sad.

207. The list of brown pigments is very long, and that of MIXED BROWNS literally endless, it being obvious that every warm colour mixed with black will afford a brown, and that equal portions of the primaries, secondaries, or tertiaries, will do the same; hence there can be no difficulty of producing them by mixture when required, which is seldom, as there are many browns which are good and permanent pigments among the following:—

208. VANDYKE BROWN

This pigment, hardly less celebrated than the great painter whose name it bears, is a species of peat or bog-earth of a fine, deep, semi-transparent brown colour. The pigment so much esteemed and used by Vandyke is said to have been brought from Cassel; and this seems to be justified by a comparison of *Cassel-earth* with the browns of his pictures. The Vandyke browns in use at present appear to be terrene pigments of a similar kind, purified by grinding and washing over: they vary sometimes in hue and in degrees of drying in oil, which they in general do tardily, owing to their bituminous nature, but are good browns of powerful body, and are durable both in water and oil. The *Campania brown* of the old Italian painters was a similar earth.

209. MANGANESE BROWN

Is an oxide of manganese, of a fine, deep, semi-opaque

brown of good body, which dries admirably well in oil. It is deficient of transparency, but may be a useful colour for glazing or lowering the tone of white without tinging it, and as a local colour in draperies, dead colouring, &c. It is a perfectly durable colour both in water and oil.

210. CAPPAGH BROWN,

Or *Euchrome*, is a *Native Manganese Brown*, found on the estate of Lord Audley at Cappagh, near Cork. It is a bog-earth or peat, mixed or mineralized by manganese in various proportions. The specimens in which the peat earth most abounds are of light weight, friable texture, and dark colour,—those which contain more of the metal are heavy and of a lighter colour.

As pigments, the peaty Cappagh brown is the most transparent, deep and rich in colour, and dries promptly in oil, during which its surface rivels where it lies thick. This may be regarded as a superior Vandyke brown and Asphaltum.

211. The other and metallic sort is a less transparent, lighter, and warmer brown pigment, which dries rapidly and smoothly in a body or thick layer, and is a superior Umber. They do not keep their place while drying in oil by fixing the oil, like the driers of lead, but run. The two extreme sorts should be distinguished as *light* and *deep* Cappagh browns; the first excellent for dead colouring, and grounds, the latter for glazing and graining. These pigments are equally applicable to painting in water, oil, and varnish, working well in each of these vehicles. They have been introduced into commerce for civil and marine

painting under the names of *Euchrome* and *Mineral brown*, and have been called Caledonian, but are more properly Hibernian browns, and are fine colours and valuable acquisitions in all their uses, and especially so in the graining of oak, &c.

212. BURNT UMBER

Is the fossil pigment called Umber, burnt, by which it becomes of a deeper and more russet hue. It contains manganese and iron, and is very drying in oil, in which it is employed as a dryer. It may be substituted for Vandyke brown, is a perfectly durable and eligible pigment in water, oil, and fresco, and may be produced artificially. The old Italians called it *falsalo*.

213. CASSEL EARTH,

Or, corruptly, *Castle earth*. The true *terre de Cassel* is an ochrous pigment similar to the preceding, but of a brown colour, more inclined to the russet hue. In other respects it does not differ essentially from Rubens and Vandyke browns.

214. COLOGN EARTH,

Incorrectly called *Cullen's earth*, is a native pigment, darker than the two last, and in no respect differing from Vandyke brown in its uses and properties as a colour. Similar earths abound in our own country. They are all bituminous ochres.

215. RUBENS BROWN.

The pigment still in use in the Netherlands under this

appellation is an earth of a lighter colour and more ochrous texture than the Vandyke brown of the London shops: it is also of a warmer or more tawny hue than the latter pigment, and is a beautiful and durable brown, which works well both in water and oil, and much resembles the brown used by Teniers.

216. BROWN OCHRE.

See *Yellow Ochre*. *Iron Brown*, *Brun de Mars*, and *Prussian Brown*, may be regarded as brown ochres, of which there is abundance in nature, and all imitable by art.

Spanish Brown, or *Tiver*. See *Red Ochre*.

217. BONE BROWN.

And *Ivory Brown* are produced by torrefying, or roasting, bone and ivory till by partially charring they become of a brown colour throughout. They may be made to resemble the five first browns above by management in the burning; and, though much esteemed by some artists, are not perfectly eligible pigments, being bad dryers in oil; and their lighter shades not durable either in oil or water when exposed to the action of strong light, or mixed in tint with white lead. The palest of these colours are also the most opaque: the deepest are more durable, and most so when approaching black.

218. ASPHALTUM,

Called also *Bitumen*, *Mineral Pitch*, *Jews' Pitch*, &c., is a resinous substance rendered brown by the action of fire, natural or artificial. The substances employed in painting

under this name are residua of the distillation of various resinous and bituminous matters in preparing their essential oils, and are all black and glossy like common pitch, which differs from them only in having been less acted upon by fire, and in thence being softer. Asphaltum is principally used in oil-painting; for which purpose it is first dissolved in oil of turpentine, by which it is fitted for glazing and shading. Its fine brown colour and perfect transparency are lures to its free use with many artists, notwithstanding the frequent destruction which awaits the work on which it is much employed, owing to its disposition to contract and crack by changes of temperature and the atmosphere; but for which it would be a most beautiful, durable, and eligible pigment. The solution of asphaltum in turpentine, united with drying-oil, by heat, or the bitumen torrefied and ground in linseed or drying-oil, acquires a firmer texture, but becomes less transparent, and dries with difficulty. If also common asphaltum, as usually prepared with oil of turpentine, be used with some addition of Vandyke brown, umber, or Cappagh brown ground in drying-oil, it will acquire body and solidity which will render it much less disposed to crack, and give it the qualities of native asphaltum: nevertheless, asphaltum is to be regarded in practice rather as a dark varnish than as a solid pigment, and all the faults of a bad varnish are to be guarded against in employing it. This pigment is now prepared in excessive abundance, as a product of the distillation of coal at the gas manufactories.

219. The native bitumen, Asphaltum, brought from

Persia by Lieutenant Ford, had a powerful scent of garlic when rubbed. In the fire it softened without flowing, and burnt with a lambent flame; did not dissolve by heat in oil of turpentine, but ground easily as a pigment in pale drying-oil, affording a fine, deep, transparent brown colour, resembling that of the asphaltum of the shops; dried firmly nearly as soon as the drying oil alone, and worked admirably both in water and oil. Asphaltum may be used as a permanent brown in water, and the native kind is also superior to the artificial for this purpose, and would be useful from its transparent richness in graining.

220. MUMMY,

Or *Egyptian Brown*, is also a bituminous substance combined with animal remains, brought from the catacombs of Egypt, where liquid bitumen was employed three thousand years ago in embalming; in which office it has combined, by a slow chemical change, during so many ages with substances which give it a more solid and lasting texture than simple asphaltum: but in this respect it varies exceedingly, even in the same subject. Its other properties and uses as a pigment are the same as those of asphaltum, for which it is employed as a valuable substitute, being less liable to crack or move on the canvass. This also may be used, when ground, as a water-colour.

221. ANTWERP BROWN

Is a preparation of asphaltum ground in strong drying-oil, by which it becomes less liable to crack. See the two last articles. Ochrous bitumens, bituminous coal, jet, and

other bituminous substances, afford similar browns. See also *Cappagh Brown* preceding.

222. BISTRE

Is a brown pigment extracted by watery solution from the soot of wood-fires, whence it retains a strong pyroligneous scent. It is of a wax-like texture, and of a citrine-brown colour, perfectly durable. It has been much used as a water-colour, particularly by the old masters in tinting drawings and shading sketches, previously to Indian ink coming into general use for such purposes. In oil it dries with the greatest difficulty.

A substance of this kind collects at the back of fire-places in cottages where peat is the constant fuel burnt; which, purified by solution and evaporation, affords a fine bistre. Scotch bistre is of this kind. All kinds of bistre attract moisture from the atmosphere.

223. SEPIA,

Seppia, or *Animal Æthiops*. This pigment is named after the sepia, or *cuttle-fish*, which is called also the *ink-fish*, from its affording a dark liquid, which was used as an ink and pigment by the ancients. From this liquid our pigment sepia, which is brought principally from the Adriatic, and may be obtained from the fish on our own coasts, is said to be obtained; and it is supposed that it enters into the composition of the *Indian ink* of the Chinese. Sepia is of a powerful dusky brown colour, of a fine texture, works admirably in water, combines cordially with other pigments, and is very permanent.

It is much used as a water-colour, and in making drawings in the manner of bistre and Indian ink; but is not used in oil, in which it dries very reluctantly.

224. MADDER BROWN.

See *Russet*, No. 186. Brown Pink. See No. 179.

225. PRUSSIAN BROWN

Is a preparation of Prussian blue, from which the blue colouring principle has been expelled by fire, or extracted by an alkaline ley; it is an orange brown, of the nature and properties of Sienna earth, and dries well in oil.

CHAPTER XVIII.

OF GRAY.

226. Of the tribe of semi-neutral colours, GRAY is the third and last, being nearest in relation of colour to black. In its common acceptation, and that in which we here use it, grey denotes a class of cool cinereous colours, faint of hue; whence we have blue grays, olive grays, green grays, purple grays, and grays of all hues, in which blue predominates; but no yellow or red grays, the predominance of such hues carrying the compounds into the classes of brown and marrone, of which gray is the natural opposite. In this sense the *semi-neutral* GRAY is distinguished from the *neutral* GREY, which springs in an infinite series from the mixture of the neutral *black* and *white*:—between *grays*

and *grey*, however, there is no intermediate, since where *colour* ends in the one, *neutrality* commences in the other, and *vice versâ*;—hence the natural alliance of the semi-neutral gray with black or shade; an alliance which is strengthened by the latent predominance of blue in black, so that in the tints resulting from the mixture of black and white, so much of that hue is developed as to give apparent colour to the tints. This affords the reason why the tints of black and dark pigments are colder than their originals, so much so as in some instances to answer the purposes of positive colours.

227. The *grays* are the natural cold correlatives, or contrasts, of the warm semi-neutral *browns*; and they are degradations of blue and its allies;—hence *blue* added to brown throws it into or toward the class of grays and hence grays are equally abundant in nature and necessary in art; for the grays comprehend in nature and painting a widely diffused and beautiful play of retiring colours in skies, distances, carnations, and the shadowings and reflections of pure light, &c.

According to the foregoing relations, grays favour the effects and force of warm colours, which in their turn also give value to grays, and by reconciling opposites gives repose to the eye.

A misapplication of colouring, however true—such as looking at nature through a prism and painting its effects—in decorations, is but to produce a fool's paradise, and to excite wonder and false admiration, in place of true effect, sentiment, and repose.

228. As blue is the ruling power of all the colours which enter into the composition of grays, the latter par-

take of the relations and affections of blue. *Grave* sounds like *grey* colours, are deep and dull; and there is a similarity of these terms in sound, signification, and sentiment, if even they are not of the same etymology: be this as it may, *gray* is almost as common with the poet, and in its colloquial use, as it is in nature and painting. The grays, like the other semi-neutrals, are sober, modest colours, contributing to the expression of cool, gloom, and sadness, bordering in these respects upon the powers of *black*, but aiding the livelier and more cheering expressions of other *colours* by connexion and contrast.

229. MIXED GRAYS

Are formed not only by the compounding of black and white, which yields *neutral greys*, and of black and blue, black and purple, black and olive, &c., which yield the *semi-neutral grays* of clouds, &c., but these may be well imitated by the mixture of russet rubiate, or madder browns, with blues, which form transparent compounds, which are much employed: grays are, however, as above remarked, so easily produced, that the artist will in this respect vary and suit his practice to his purpose. The *lead colours* of common painting are formed by adding black to white lead in oil. They are very useful grounds and dead colourings or greens, &c.

230. NEUTRAL TINT.

Several mixed pigments of the class of gray colours sold for Neutral tint, variously composed of sepia and indigo or other blues, with madder or other lakes, and are

designed for water-colour painting only, in which they are found extremely useful. And here it may be proper to mention those other useful pigments, sold under the name of tints, which belong to no particular denomination of pigments; but being compounds, the result of the experience of accredited masters in their peculiar modes of practice serve to facilitate the progress of their pupils. Such are *Harding's* and *Macpherson's tints*, usually sold ready prepared in cakes and boxes for miniature and water-painting. These are composed of pigments which associate cordially; nevertheless, the artist will in general prefer a dependence upon his own skill for the production of his tints in painting, both in water and oil.

231. ULTRAMARINE ASHES,

Or *Mineral Gray*, are the recrement of Lapis lazuli, from which ultramarine has been extracted, varying in colour from dull gray to blue. Although not equal in beauty, and inferior in strength of colour, to ultramarine, they are extremely useful pigments, affording grays much more pure and tender than such as are composed of black and white, or other blues, and better suited to the pearly tints of flesh, foliage, the grays of skies, and the shadows of draperies, but are not necessary to the ordinary painter who can form them of cheaper pigments.

232. PHOSPHATE OF IRON

Is a native ochre, which classes in colour with the deeper hues of ultramarine ashes, and is eligible for all their uses. It has received the appellation of *blue ochre*.

Slate clays and several native earths class with grays; but the colours of the latter are not durable, but become brown by the oxidation of the iron they contain.

233. PLUMBAGO.

See *Black Lead,* which forms *grey* tints of greater permanence and purity than the blacks in general use, and it is now employed for this purpose with approved satisfaction by experienced artists.

Chapter XIX.

OF THE NEUTRAL.

BLACK.

234. Black is the last and lowest in the series or scale of colours descending—the opposite extreme from white—the maximum of colour. To be perfect it must be neutral with respect to colours individually, and absolutely transparent, or destitute of reflective power in regard to light; its use in painting being to represent shade or depths, of which it is the element in a picture and in colours, as white is of light.

235. As there is no perfectly pure and transparent black pigment, black deteriorates all colours in deepening them, as it does warm colours by partially neutralizing them, but it combines less injuriously with cold colours. Though it is the antagonist or contrast of white, yet added

to it in minute portion it in general renders white more neutral, solid, and local, with less of the character of light. Impure black is brown, but black in its purity is a cold colour, and communicates this property to all light colours; thus it *blues* white, *greens* yellow, *purples* red, and degrades blue and other colours; hence the artist errs who regards black as of nearest affinity to hot and brown colours.

236. It is the most retiring of all colours, which property it communicates to other colours in mixture. It heightens the effect of warm as well as of light colours, by a double contrast when opposed to them, and in like manner subdues that of cold and deep colours; but in mixture or glazing these effects are reversed, by reason of the predominance of cold colour in the constitution of black: having therefore the double office of colour and of shade, black is perhaps the most important of all colours to the artist, both as to its use and avoidance.

237. Black is to be considered as a synthesis of the three primary colours, the three secondaries, or the three tertiaries, or of all these together; and, consequently, also of the three semi-neutrals, and may accordingly be composed of due proportions of either tribe or triad. All antagonist colours, or contrasts, also afford the neutral black by composition; but in all the modes of producing black by compounding colours, blue is to be regarded as its predominating colour, and yellow as subordinate to red, in the proportions, when their hues are true, of eight blue, five red, and three yellow. It is owing to this predominance of blue in the constitution of black, that it contributes by mixture to the pureness of hue in white colours,

which in general incline to warmth, and it produces the cool effect of blueness in glazing and tints, or however otherwise diluted or dilated. It accords with the principle here inculcated that in glass-founding, the oxide of manganese, which affords the *red* hue, and that of cobalt which affords the *blue*, are added to brown or *yellow* frit to produce a velvety-black glass; and that the dyer proceeds to dye black upon a deep *blue* basis of indigo, with the *ruddy* colour of madder and the *yellow* of quercitron, galls, sumach, &c.; and experience coincides with principle in these practices, but if the principle be wanting the artist will often fail in his performances.

238. All colours are comprehended in the synthesis of black, consequently the whole sedative power of colour is comprised in black. It is the same in the synthesis of white; and, with like relative consequence, white comprehends all the stimulating powers of colour in painting. It follows that a little black or white is equivalent to much colour, and hence their use as colours requires judgment and caution in painting; and in engraving, black and white supply the place of colours, and hence a true knowledge of the active or sedative power of every colour is of great importance to the engraver.

239. By due attention to the synthesis of black it may be rendered a harmonizing medium to all colours, and it gives brilliancy to them all by its sedative effect on the eye, and its powers of contrast; nevertheless, we repeat, as a pigment it must be introduced with caution in painting when *hue* is of greater importance than *shade*; and black pigments produced by charring have a disposition to rise and predominate over other hues, and to subdue the more deli-

cate tints by their chemical bleaching power upon other colours, and their own disposition to turn brown or dusky. And for these reasons deep and transparent colours, which have darkness in their constitution, are better adapted in general for producing true natural and permanent effects.

240. Black is to be regarded as a compound of all other colours, and the best blacks and neutrals of the painter are those formed with colours of sufficient power and transparency upon the palette; but most of the black pigments in use are produced by charring, and owe their colour to the carbon they contain: such are *Ivory* and *Bone blacks*, *Lamp black*, *Blue black*, *Frankfort black*, &c. The three first are most in use, and vary according to their modes of preparation or burning; yet fine *Frankfort black*, though principally confined to the use of the engraver and printer, is often preferable to the others.

Native or *mineral blacks* are heavy and opaque, but dry well.

Black pigments are innumerable: the following are however the principal, all of which are permanent colours:—

241. IVORY BLACK,

And *Bone Black* are ivory and bone charred to blackness by strong heat in closed vessels. These pigments vary principally through want of care or skill in preparing them; when well made, they are fine neutral blacks, perfectly durable and eligible both for oil and water painting; but when insufficiently burnt they are brown, and dry badly; and when too much burnt, they are cineritious, opaque, and

faint in colour. Of the two, ivory affords the best pigment; but bone-black is commonly used, and immense quantities are consumed with sulphuric acid in manufacturing of *shoe-blacking*.

242. LAMP BLACK,

Or *Lamblack*, is a smoke-black, being the soot of resinous woods, obtained in the manufacturing of tar and turpentine. It is a pure carbonaceous substance of a fine texture, intensely black, and perfectly durable, which works well, but dries badly in oil. This pigment may be prepared extemporaneously for water-painting by holding a plate over the flame of a lamp or candle, and adding gum-water to the colour: the nearer the plate is held to the wick of the lamp, the more abundant and warm will be the hue of the black obtained; at a greater distance it will be more effectually charred and blacker. This is a good substitute for Indian ink, the colouring basis of which appears to be lamp-black. The *Nero di foglio* of the Italians is prepared from the smoke of burnt paper.

243. FRANKFORT BLACK

Is said to be made of the lees of wine from which the tartar has been washed, by burning, in the manner of ivory-black. Similar blacks are prepared of *vine twigs and tendrils*, which contain tartar; also from *peach-stones*, &c., whence *almond-black* and *peach-black*; and the Indians employ for the same purpose the *shell of the cocoanut:* and inferior Frankfort black is merely the levigated charcoal of woods, of which the hardest, such as box and ebony, afford the best. Fine

Frankfort black though almost confined to copper-plate printing, is one of the best black pigments we possess, being of a fine neutral colour, next in intensity to lamp-black, and more powerful than that of ivory. Strong light has the effect of deepening its colour; yet the blacks employed in the printing of engravings have proved of very variable durability. It is probable that this black was used by some of the Flemish painters, and that the pureness of the greys formed therewith is attributable to the property of charred substances to prevent discolourment; although they have not the power of bleaching oils as they have of many other substances.

244. BLUE BLACK

Is also a well-burnt and levigated charcoal, of a cool, neutral colour, and not differing in other respects from the common Frankfort black above-mentioned. Blue black was formerly much employed in painting, and, in common with all carbonaceous blacks, has when duly mixed with white, a preserving influence upon that colour in two respects; which it owes, chemically, to the bleaching power of carbon, and, chromatically, to the neutralizing and contrasting power of black with white. A superior blue black may be prepared by calcining Prussian blue in a close crucible, in the manner of ivory black: and it has the important property of drying well in oil; innumerable black pigments may be produced in this way by charring.

245. SPANISH BLACK

Is a soft black, prepared by burning *cork* in the manner of

Frankfort and ivory blacks; and it differs not essentially from the former, except in being of a lighter and softer texture. It is subject to the variation of the above charred blacks, and eligible for the same uses. *Paper black*, the *Nero di foglio* of the Italians, often prepared in the same way, much resembles Spanish black as does also Prussian black prepared by roasting Prussian blue.

246. MINERAL BLACK

Is a native impure oxide of carbon, of a soft texture, found in Devonshire and Wales. It is blacker than plumbago, and free from its metallic lustre,—is of a neutral colour, greyer and more opaque than ivory black,—forms pure neutral tints,—and being perfectly durable, and drying well in oil, it is valuable in dead colouring on account of its solid body, as a preparation for black and deep colours before glazing. It would also be the most durable and best possible black for frescoes. *Russian black* is of this class.

247. MANGANESE BLACK.

The common black oxide of manganese answers to the character of the preceding pigment, and is the best of all blacks for drying in oil without addition, or preparation of the oil. It is also a colour of much body and tinging power.

248. BLACK OCHRE

Is a variety of the mineral black above, combined with iron and alluvial clay. It is found in most countries, and should be washed and exposed to the atmosphere before it is used.

Sea-coal, and innumerable black mineral substances, have been and may be employed as succedanea for the more perfect blacks, when the latter are not procurable, which rarely happens.

249. BLACK CHALK

Is an indurated black clay, of the texture of white chalk, and is naturally allied to the preceding article. Its principal use is for cutting into crayons, which are employed in sketching and drawing.

Fine specimens have been found near Bantry in Ireland, and in Wales, but the Italian has the best reputation. Crayons for these uses are also prepared artificially, which are deeper in colour and free from grit. Charcoal of wood is also cut into crayons for the same purpose, and the charcoals of soft woods, such as lime, poplar, &c., are fittest for this use.

250. INDIAN INK.

The pigment well known under this name is principally brought to us from China in oblong cakes, of a musky scent, ready prepared for painting in water; in which use it is so well known, and so generally employed, as hardly to require naming. It varies, however, considerably in colour and quality, and is sometimes, properly, called *China ink*. Various accounts are given by authors of the mode of preparing this pigment, the principal substance or colouring-matter of which is a smoke-black, having all the properties of our lamp-black; and the variety of its hues and texture seems wholly to depend upon the degree of burning and

levigating it receives. The pigment known by the name Sepia is supposed to enter into the composition of the better sort.

251. BLACK LEAD,

Plumbago, or *Graphite*, is a native carburet of iron or oxide of carbon, found in many countries, but nowhere more abundantly, or so fine in quality, as at Borrodale in Cumberland, where there are mines of it, from which the best is obtained, and consumed in large quantity in the formation of crayons and the black-lead pencils of the shops, which are in universal use in writing, sketching, designing, and drawing; for which the facility with which it may be rubbed out by Indian rubber or caoutchouc, gutta percha, and the crumb of bread, admirably adapts it.

Although not acknowledged as a pigment, its powers in this respect claim a place for it, at least among water-colours; in which way, levigated in gum-water in the ordinary manner, it may be used effectually with rapidity and freedom in the shading and finishing of pencil drawings, &c., and as a substitute therein for Indian ink. Even in oil it may be useful occasionally, as it possesses remarkably the property of covering, forms very pure *grey* tints, dries quickly, injures no colour chemically, and endures for ever. These qualities render it the most eligible black for adding to white in minute quantity to preserve the neutrality of its tint.

252. Although plumbago has usurped the name of *Black Lead*, there is another substance more properly entitled to this appellation, and which may also be safely em-

ployed in the same manner, and with like effects as a pigment. This substance is the *Sulphuret of Lead*, either prepared artificially, or as found native in the beautiful lead-ore, or *Galena*, of Derbyshire.

Chapter XX.

TABLES OF PIGMENTS, &c.

253. As there are circumstances under which some pigments may very properly and safely be used, which under others might prove injurious or destructive to the work, the following Lists or Tables are subjoined, in which they are classed according to various general properties, as guides to a judicious selection. These Tables are the results of direct experiments and observation, and are composed, without regard to the common reputation or variable character of pigments, according to the real merits of the various specimens tried.

254. As the properties and effects of pigments are much influenced by adventitious circumstances, and are sometimes varied or altogether changed by the grounds on which pigments are used, by the vehicles in which they are used, by the siccatives and colours with which they are used, and by the varnishes by which they are covered. These Tables are offered only as approximations to the true characters of pigments and as general guides to right practice. They render it also apparent, as a general con-

clusion, that the majority of pigments have a mediocrity of qualification balancing their excellences with their defects, and that the number of good and eligible pigments overbalances those which ought in general to be rejected.

TABLE I.

255. Of Pigments, the colours of which suffer different degrees of change by the action of light, oxygen, and pure air; but are little, or not at all, affected by shade, sulphuretted hydrogen, damp, and foul air:—

- Yellow
  - Yellow Lake
  - Pink (Dutch, English, Italian)
  - Yellow Orpiment
  - King's Yellow
  - Chinese Yellow
  - Gamboge
  - Gallstone
  - Indian Yellow
- Red
  - Cochineal Lakes (Rose Pink, Carmine, Common Florence, Scarlet, Hambro')
- Blue
  - Indigo
  - Intense Blue
  - Antwerp Blue
  - Prussian Blue
- Orange
  - Orange Orpiment
  - Golden Sulphur of Antimony
- Green
  - Sap Green
- Purple
  - Puple Lake
  - Burnt Carmine
  - Lac Lake
- Brown
  - Brown Pink
  - Light Bone Brown, &c.

256. REMARKS.—None of the pigments in this Table are eminent for permanence. No white or black pigment whatever belongs to this class, nor does any tertiary, and a few only of the original semi-neutrals. Most of those included in the list fade or become lighter by time, and also, in general, less bright.

TABLE II.

257. Pigments, the colours of which are little, or not at all, changed by light, oxygen, and pure air; but are more or less injured by the action of shade, sulphuretted hydrogen, damp, and impure air:—

White: Common White Lead, Flake White, Crems White, Roman White, Venetian White, Blanc d'Argent, Sulphate of Lead	Blue..: Blue Verditer, Sanders Blue, Mountain Blue, Royal Blue, Smalt and other Cobalt Blues
Yellow: Massicot, Patent Yellow, Jaune Minerale, Chrome Yellow, Naples Yellow	Orange: Orange Lead, Orange Chrome, Chromate of Mercury, Laque Mineral
Red..: Red Lead, Chrome Red, Dragon's Blood, Iodine Scarlet	Green: Green Verditer, Mountain Green, Common Chrome Green, Mineral Green, Verdigris, and other Copper Greens

258. Remarks.—Most of our best white pigments are comprehended in this Table, but no black, tertiary, or semi-neutral colour.

Many of these colours, when secured by oils and varnish, &c., may be long protected from change. The pigments of this Table may be considered as more durable than those of the preceding; they are nevertheless ineligible in a water-vehicle, and in fresco; and most of them become darker by time alone in every mode of use.

This list is the opposite of Table I.

TABLE III.

259. Pigments, the colours of which are subject to change by the action both of light and oxygen, and the opposite powers of sulphuretted hydrogen, damp, and impure air:—

White	Pearl or Bismuth White Antimony White	Orange	Sulphate of Antimony Anotta Caruecu
Yellow	Turbith Mineral Patent Yellow	Green	Verdigris
Red	Iodine Scarlet Dragon's Blood	Russet	Prussiate of Copper
Blue	Royal Blue Prussian Blue Antwerp Blue		

260. REMARKS.—This Table comprehends our most imperfect pigments, and demonstrates how few absolutely bad have obtained currency. Indeed several of them are valuable for some uses, and not liable to sudden or extreme change by the agencies to which they are here subjected. Yet the greater part of them are destroyed by time.

These pigments unite the bad properties of those in the two preceding Tables.

TABLE IV.

261. Pigments not at all, or little, liable to change by the action of light, oxygen, and pure air; nor by the opposite influences of shade, sulphuretted hydrogen, damp and impure air; nor by the action of lead or iron:—

White	Zinc White Constant, or Barytic White Tin White The Pure Earths
Yellow	Yellow Ochre Oxford Ochre Roman Ochre Sienna Earth Stone Ochre Brown Ochre
Red	Vermilion Rubiates, or Madder Lakes Madder Carmines Red Ochre Light Red Venetian Red Indian Red
Blue	Ultramarine Blue Ochre
Orange	Orange Ochre Jaune de Mars Burnt Sienna Earth Burnt Roman Ochre Light Red, &c.
Green	Chrome Greens Terre-Verte Cobalt Green
Purple	Gold Purple Madder Purple Purple Ochre
Russet	Russet Rubiate, or Madder Brown Intense Russet
Brown and Semi-neutral	Vandyke Brown Bistre Raw Umber Burnt Umber Cassel Earth Cologne Earth Asphaltum Mummy, &c. Ultramarine Ashes Sepia Manganese Brown Cappagh Brown
Black	Ivory Black Lamp Black Frankfort Black Mineral Black Black Chalk Indian Ink Graphite

262. REMARKS.—This Table comprehends all the best and most permanent pigments, and such as are eligible for water and oil painting. It demonstrates that the best pigments are also the most numerous, and browns the most abundant, and in these respects stands opposed to the three Tables preceding.

TABLE V.

263. Pigments subject to change variously by the action of white lead and other pigments, and preparations of that metal:—

- Yellow
  - Massicot
  - Yellow Orpiment
  - King's Yellow
  - Chinese Yellow
  - Gamboge
  - Gall-stone
  - Indian Yellow
  - Yellow Lake
  - Pink
    - Dutch
    - English
    - Italian
- Red ..
  - Iodine Scarlet
  - Red Lead
  - Dragon's Blood
  - Lakes
    - Common Cochineal
    - Florence Scarlet
    - Hambro' Lac
  - Carmine
  - Rose Pink
- Blue ... Indigo
- Orange
  - Orange Lead
  - Orange Orpiment
  - Golden Sulphur of Antimony
  - Anotta, or Roucou
  - Carucru, or Chica
- Green .. Sap Green
- Purple
  - Purple Lake
  - Burnt Carmine
- Citrine . Brown Pink

264. REMARKS.—Acetate or sugar of lead, litharge, and oils rendered drying by oxides of lead, are all in some measure destructive of these colours. Light, bright, and tender colours are principally susceptible of change by the action of lead.

The colours of this Table are very various in their modes of change, and thence do not harmonize well by time: it follows, too, that when any of these pigments are employed, they should be used pure or unmixed; and,

by preference, in varnish: while their tints with white lead ought to be altogether rejected.

TABLE VI.

265. Pigments, the colours of which are subject to change by iron, its pigments, and other ferruginous substances:—

White — Sulphate of Lead; Blanc d'Argent	Blue — Blue Verditer; Mountain Blue; Intense Blue
Yellow — King's Yellow; Patent Yellow; Naples Yellow; Chinese Yellow	Orange — Golden Sulphur of Antimony
Red — Iodine Scarlet; Carmine; Scarlet Lake	Green — Verdigris; Green Verditer
	Russet — Prussiate of Copper

266. Remarks.—Several other delicate pigments are slightly affected by iron and its preparations; and with all such, as also with those of the preceding Table, and with all pigments not well freed from acids or salts, the iron palette knife is to be avoided or used with caution, and one of ivory or horn substituted in its place. Nor can the pigments of this Table be in general safely combined with the ochres. Strictly speaking, that degree of friction which abrades the palette-knife in rubbing of pigments therewith is injurious to every bright colour.

TABLE VII.

267. Pigments more or less transparent, and generally fit to be employed as graining and finishing colours, if not disqualified according to Tables I., II., and III.:—

- **Yellow**
  - Sienna Earth
  - Gamboge
  - Indian Yellow
  - Gallstone
  - Pink
    - Italian
    - English
    - Dutch
  - Yellow Lake
- **Red**
  - Madder Carmine
  - Madder Lakes
  - Lac Lake
  - Carmine
  - Lakes
    - Common
    - Florence
    - Scarlet
    - Hambro'
  - Dragon's Blood
  - Rose Pink
- **Blue**
  - Ultramarines
  - Cobalt Blue
  - Smalt
  - Royal Blue
  - Prussian Blue
  - Antwerp Blue
  - Intense Blue
  - Indigo
- **Orange**
  - Madder Orange
  - Anotta
  - Burnt Sienna Earth
  - Jaune de Mars
- **Green**
  - Chrome Green
  - Sap Green
  - Prussian Green
  - Terre-Verte
  - Verdigris
- **Purple**
  - Madder Purple
  - Burnt Carmine
  - Purple Lake
  - Lac Lake
- **Citrine**
  - Brown Pink
  - Citrine Lake
- **Russet**
  - Madder Brown
  - Prussiate of Copper
- **Brown**
  - Vandyke Brown
  - Cologne Earth
  - Burnt Umber
  - Bone Brown
  - Asphaltum
  - Mummy
  - Brown Pink
  - Antwerp Brown
  - Bistre
  - Sepia
  - Prussian Brown
- **Gray** .. Ultramarine Ashes
- **Black**
  - Ivory Black
  - Bone Black
  - Lamp Black
  - Frankfort Black
  - Blue Black
  - Spanish Black

268. REMARKS.—This Table comprehends most of the best water-colours; and their most powerful effects in oil-painting are attainable by employing them with resinous varnishes. Pigments not inserted in this Table may of course be considered of an opposite class, or *opaque*

colours; with which, nevertheless, transparent effects in painting are produced by the skill of the artist in breaking and mingling without mixing them, &c.

268. The great importance of transparent pigments is to unite, and give tone and atmosphere generally, with beauty and life, to solid or opaque colours of their own hues; to convert primary into secondary, and secondary into tertiary colours with brilliancy; to deepen and enrich dark colours and shadows, and to give force and tone to black itself.

TABLE VIII.

269. Pigments, the colours of which are little or not at all affected by heat or fire:—

White	Tin White Barytic White Zinc White The Pure Earths
Yellow	Naples Yellow Patent Yellow Antimony Yellow
Red...	Red Ochre Light Red Venetian Red Indian Red
Blue..	Royal Blue Smalt Dumont's Blue and all Cobalt Blues Ultramarine
Orange	Orange Ochre Jaune de Mars Burnt Sienna Earth Burnt Roman Ochre
Green	True Chrome Green Cobalt Green
Purple	Gold Purple Purple Ochre
Brown	Rubens Brown Burnt Umber Cassel Earth Cologne Earth Antwerp Brown Manganese Brown
Black	Graphite Mineral Black

270. Remarks.—Many of the pigments of this Table are available in enamel painting, and most of them are durable in the other modes.

TABLE IX.

271. Pigments which are little or not at all affected by *lime*, and in various degrees eligible for fresco, distemper, and crayon painting :—

White	Barytic White Pearl White Gypsum, and all Pure Earths
Yellow	Yellow Ochre Oxford Ochre Roman Ochre Sienna Earth Stone Ochre Brown Ochre Indian Yellow Patent Yellow Naples Yellow Massicot
Red...	Vermilion Red Lead Red Ochre Light Red Venetian Red Indian Red Madder Reds
Blue ..	Ultramarine Smalt, and all Cobalt Blues
Orange	Orange Lead Orange Chrome Laque Mineral Orange Ochre Jaune de Mars Burnt Sienna Earth Light Red, &c.
Green	Green Verditer Mountain Green Chrome Green Mineral Green Emerald Green Verdigris and other Copper Greens Terre-Verte Cobalt Green
Purple	Gold Purple Madder Purple Purple Ochre
Brown and Semi-neutral	Bone Brown Vandyke Brown Rubens Brown Bistre Raw Umber Burnt Umber Cassel Earth Cologne Earth Antwerp Brown Chestnut Brown Asphaltum Mummy Ultramarine Ashes Manganese Brown
Black	Ivory Black Lamp Black Frankfort Black Mineral Black Black Chalk Indian Ink Graphite

272. REMARKS.—This Table shews the multitude of pigments from which the painters in fresco, scagliola, distemper, and crayons, may select their colours; in doing which, however, it will be necessary they should consult

the previous Tables respecting other qualities of pigments essential to their peculiar modes of painting, as these modes are exciting renewed interest in the world of art, tending to their extension in practice, particularly the latter of them.

TABLE X.

273. HERALDIC COLOURS.

Escutcheons.	How Engraved.	Colours.	Gentlemen / Tinctures.	Nobles. / Jewels.	Sov. Princes. / Planets.	Signs.
	Blank	White ...	Argent...	Pearl ...	Luna	☽
	Dotted	Yellow...	Or	Topaz ...	Sol.....	☉
	Perpendicular Lines.	Red.....	Gules ...	Ruby ...	Mars	♂
	Horizontal Lines ...	Blue ...	Azure ...	Sapphire	Jupiter ...	♃
	Diag. Dexter	Green ...	Vert.....	Emerald	Venus.....	♀
	Diag. Crossed	Orange	Tenne ...	Jacynth	Dragon's head	☊
	Diag. Sinist....	Purple...	Purpure	Amethyst	Mercury...	☿
	Horizontal Diagonal	Murrey	Sanguin	Sardonyx	Dragon's tail ...	☋
	Horizontal Perpen.	Black ...	Sable ...	Diamond	Saturn ...	♄

274. Remarks.—Heraldry, the most arbitrary of the sciences, having no foundation whatever in nature, has nevertheless employed colours with more consistent classification than the more natural and legitimate arts, and being intimately connected with decorative painting in the emblazoning of arms and the illuminating of missals, books, deeds, and treaties; and being also of occasional reference to higher art, a brief notice of heraldic colouring and its symbols may be considered as a useful appendage to a work on painting. The present Table may also serve, by the comparison of colours, jewels, &c., to denote the colours themselves, and identify their names according to natural resemblances, and as a guide to the constructing of signals, &c.

The manner of denoting colours by the scoring and crossing of lines on escutcheons may be usefully employed by artists in sketching as memorand for painting the accidental and local colours of objects. Those who take interest in *symbolic colouring* may have ample gratification by referring to Baron Portal's work on the subject, translated from the French by J. Inman, Esq.

Part III.

Chapter XXI.

ON VEHICLES, &c.

275. Since colours and pigments are liable to material influence, and changes of effect, from the materials employed in painting for tempering, combining, distributing, and securing them on their grounds in the various modes of the art, the powers and properties of oils, vehicles and varnishes are of hardly less importance than those of colours themselves; they are therefore, an essential branch of our subject. Vehicles, which term is borrowed from pharmacy, are, indeed, among the chief materials and indispensable means of painting, and give name to its principal modes under the titles of painting in Water, Oil, Varnish, Distemper and Fresco: we will consider them, therefore, in these respects.

276. It is observable that the colours of pigments bear out with effects differing according to the liquids with which they are combined, and the substances those liquids hold in solution, which in some instances obscure or depress, and in others enliven or exalt the colours; in the first case by the tinge and opacity of the fluid, and in the latter, by its colourless transparency, and sometimes also much more so by a refractive power; as in varnishes made of pure

resinous substances, which have a very evident and peculiarly exalting effect upon colours, that continues when they are dry; because resins form a glossy transparent cement, while the media, formed by expressed oils become horny, or semi-opaque. And this principle applies also to aqueous and spirituous vehicles in water painting, according to the nature of the substances they may hold in solution.

277. WATER VEHICLES.

The most natural or fit distribution of vehicles is into those of *water*, *oils*, and *varnishes*; under which heads we proceed to regard them, and the various substances employed as additions, according to the variety of practice.

As the action of AQUEOUS LIQUIDS, and solvents upon colours, is stronger and more immediate than that of oils and varnishes, it is of great importance to the water-colour painter that he should attend to the pureness of his water, as in all hard and impure waters, colours are disposed to separate and curdle, so that it is often impossible a clear flowing wash, or gradation of colour, should be obtained with them.

278. As water is not sufficient to connect, bear out, and secure colours on their grounds in painting, owing to its entirely evaporating in drying, additions of permanently adhesive substances soluble therein are necessary; such as vegetal gums, mucilages, farinaceous paste, sugar, animal glues and size, glare of egg, serum of blood, milk, curd, whey, &c., and finally mineral solids, such as quick-lime, alum, borax, &c., and these variously mixed and compounded: whence a variety of empirical methods of painting.

279. *Water*, as a vehicle compared with *oil*, is of simple and easy use, drying readily, and being subject to little alteration of colour or effect subsequently; for notwithstanding oils and varnishes are less chemically active upon colours than aqueous fluids are, the vehicles of the oil-painter subject him to all the perplexities of their bad drying, change of colour, blooming, and cracking,—to habits varying with a variety of pigments, and to the contrariety of qualities, by which they are required to unite tenuity with strength, and to be fluid without flowing, &c.; to provide for and reconcile all which has continually exercised the ingenuity of the oil-painter.

280. MUCILAGES.

Gum, or some mucilaginous substance, is a necessary addition to water to give pigments their requisite cohesion, and to attach the colours to the grounds on which they are applied, as well as to give them the property of bearing out to the eye, according to the intention of the artist; upon which, and upon the pigments used, depend the proportions of gum to be employed, gum being a constituent of some pigments, while others are of textures to require it in considerable quantity to give them proper tenacity,—qualities we have adverted to in speaking of individual pigments: as a general rule, however, the proportion of gum, &c., employed with a colour should be sufficient to prevent its abrasion, but not so much as to occasion its scaling or cracking, both of which are easily determined by trial upon paper.

281. GUMS.

Of *Gums*, SENEGAL is the strongest and best suited to dark colours, being of a brown hue; but the light-coloured pieces may be employed for the more delicate pigments. All gums contain an acid, very unfavourable to their preservation in a fluid state; which acid requires, therefore, to be neutralized by the addition of some alkaline substance, of which we have found the carbonate of ammonia, being volatile, to be the best; a small portion of which being shook into the dissolved gum will purify it by precipitating all its foulness, and preserve it a very long time for use, and very much improve the working of colours without occasion for gall: the gum will rarely require more than one scruple of the powdered carbonate to an ounce of the gum dissolved by maceration in two or three ounces of cold water. Solution of borax will answer the same purpose, but less eligibly.

282. GUM ARABIC is in general clearer and whiter than Senegal, and hence is better adapted to the brighter and more delicate colours. It should be picked and purified by solution in cold water, straining, and decanting; and should be used fresh, or preserved by addition of alcohol, or by ammonia in the manner already described.

283. AMMONIA, or *Gum Ammoniac*, is a gum-resin, soluble in spirit and in water, in the latter of which it forms a milky fluid that dries transparent: it has many properties which render it useful in water-painting. It is avoided by insects, is very tenacious, and affords a middle vehicle between oil and water, with some of the advantages of both.

It contributes also, in the manner of a varnish, to protect the more fugitive colours over which it may be glazed, or with which it may be mixed, and on this account it is eligible in water-painting.

284. TRAGACANTH

Is a strong colourless gum, soluble in hot water, and of excellent use when colours are required to lie flat, or not bear out with gloss, and also when a gelatinous texture of the vehicle is of use to prevent the flowing of the colours; *starch*, as prepared by the laundress—water in which *rice* has been boiled, used by the Chinese, and *paste* of wheaten flour are available for the same purpose. *Sugar* and *honey* have also been employed, but as they attract flies and moisture, are better avoided.

285. SIZE

Is prepared either by long boiling the shreds of parchment &c., or from *glue* by soaking in cold water, and subsequently dissolving by heat. The quantity to be used depends like that of gums on the quality of the pigments employed, and caution is more necessary than with the gums not to use it in excess on account of its disposition to contract in drying, and occasion the colour to crack and scale off. The lighter coloured *fish-glue* and *isinglass* are substituted for the nicer kinds of painting; *albumen* or *white of egg*, and also the *yolk* employed by glovers, is used in some cases; *oxgall* is useful when the surface to be painted is polished, or works greasy. Size is sometimes worked into oil colours instead of mastic varnish to gelatinize and give them crispness.

286. MILK OF LIME,

Is commonly employed in distemper painting without size, as a white basis and cement of colours, with or without addition of drying oil, and when dry, stands weather with considerable firmness. It is prepared by slacking lumps of white quick-lime in water.

287. BORAX

Is a mild alkaline salt, useful for neutralizing the acidity of gums, and as a substitute for animal gall in attaching colours to polished or oily surfaces. It is also valuable as a *medium* for uniting varnishes and oils with water, in an intermediate mode of painting, which after drying is insoluble in water and may be washed. In small quantity borax promotes the drying of oils.

288. MEDIUMS.

Many attempts have been made to unite the advantages of the two modes of painting—of water and oil—either by successive processes, or by the use of a vehicle of a compound or intermediate affinity to both of these fluids, and thence technically denominated a *medium;* a term otherwise properly applicable to every vehicle.

289. With regard to *mediums*, all the gelatinous substances before-mentioned as additions to water vehicles may be combined with linseed and other oils, and such compounds may be employed as vehicles, and will keep their place as delivered by the brush in painting. Indeed starch, as pre-

pared by the laundress, has been lately recommended for this purpose. Nevertheless we regard these mixtures as both chemically and mechanically inferior to the combination of lac and borax, which is equally diffusible in water and in oil, and does not contract in drying, or render the painting penetrable by moisture as farinaceous and mucilaginous substances do, nor, in the end, dispose the work to crack. It has accordingly been proposed that artists should adopt the Indian process of painting, in which lac is rendered saponaceous and miscible in water by the medium of borax; but against this process the foul colour and opacity of the vehicle have been heretofore justly objected. If, however, one part of borax be dissolved in twelve of boiling water, and the solution be added in equal, or other proportions, to white lac varnish, a perfectly transparent colourless liquid is formed, which diffuses freely in water, and may be used, with some difficulty, as a quick-drying vehicle for painting instead of oil, and when dry, is not acted on or removable by water: add to this, that as this lac vehicle is as freely miscible with oil as it is with water, it supplies a true medium, or connecting link between painting in water and oil, which may, in ingenious hands, unite the advantages of both.

290. DRYERS,

Or *Siccatives*. With respect to DESICCATION OR DRYING, the well-known additions of the acetate or *sugar of lead*, *litharge*, and *sulphate of zinc*, called also improperly *white copperas* and *white vitriol*, either mechanically ground or in solution, for light colours; and *japanner's gold size*, or oils

boiled upon litharge for lakes, or in some cases *verdigris* and *manganese* for dark colours, may be resorted to when the colours or vehicles are not sufficiently good dryers alone: but it requires attention, that an excess of dryer renders oils saponaceous, is inimical to drying, and injurious to the permanent texture of the work. Some colours, however, dry badly from not being sufficiently edulcorated or washed, and many are improved in drying by passing through the fire, or by age. Sulphate of zinc, as a dryer, is less powerful than acetate of lead, but is preferable in use with some colours, upon which it acts less injuriously: but it is supposed, erroneously, to set the colours running; which is not positively the case, though it will not retain those disposed to it, because it wants the property the acetate of lead possesses, of gelatinizing the mixture of oil and varnish. These two dryers should not be employed together, as frequently directed, since they counteract and decompose each other by double election,—forming two new substances, the acetate of zinc which is an ill dryer, and the sulphate of lead, which is insoluble and opaque.

291. It is not always that ill drying is attributable to the pigments or oils,—the states of the weather and atmosphere have great influence thereon. The oxygenating power of the direct rays of the sun renders them peculiarly active in drying oils and colours, and was probably resorted to before dryers were added to oils, and the atmosphere is imbued with the active matter of light to which its drying property may be attributed. The ground may also advance or retard drying, because some pigments, united either by mixing or glazing, are either promoted or obstructed in

drying by their conjunction, artificial heat also promotes drying.

292. The various affinities of pigments occasion each to have its more or less appropriate dryer; and it would be a matter of useful experience if the habits of every pigment in this respect were ascertained;—siccatives of less power generally than the above, such as the acetate of copper, *massicot*, *red lead*, and the oxides of manganese, to which *umber* and the Cappagh browns owe their drying quality, and others might come into use in particular cases. Many other accidental circumstances may also affect drying. Dryers should be added to pigments only at the time of using them, because they exercise their drying property while chemically combining with the oils employed, during which thelatter become thick or fatten, and render additional oil and dryer necessary when again used. *Acetate of lead* dissolved in water, spirit, or turpentine may be used as a dryer of oil paints, with convenience and advantage in some cases.

293. In the employment of dryers attention is necessary—1. Not to add them uselessly to pigments that dry well in oil alone.—2. Not to employ them in excess which retards drying.—3. Not to add them to the colour till it is to be used.—4. Not to add several kinds of dryers to the same colour; and—5. To use simple dryers in preference to nostrums recommended and vended for drying of paints. impurity of the pigment sometimes retards drying, in which case it should be washed.

294. Another attention should be, that one coat of paint should be thoroughly dry before another is applied;

for if the upper surface of paint dry before the surface beneath it, it will *rivel* by the expansion and contraction of the under surface, as the oil evaporates and dries: overloading with paint will be attended by the same evil, and if the upper surface be of varnish or brittle, *cracking* of the paint will ensue.

Chapter XXII.

ON OILS, &c.

295. Oils are distinguished into *Fat oils*, *Drying oils*, and *Volatile oils;* the two first are also called *fixed and expressed oils*, as the latter are *essential oils*. All oils become thickened by age, and more rapidly so by contact of air and combination with its oxygen; in which case if the oil be fat or unctious oil, such as olive oil and all animal oils, *stearine*, or tallow, is produced and separated from the *elain*, *olein*, or fluid oil; if it be a drying oil, such as linseed and painter's oil, *caoutchouc* or gluten, is in like manner produced; and if it be a volatile or essential oil, such as that of turpentine, solid *resin* is formed therein: a third and acid substance is formed in oils when they become rancid, called *margarine*, which is inimical to drying. *Wax* is produced by the action of oxygen on a compound fat and essential oil; wax is therefore a substance between resin and stearine or tallow. All these substances may be regarded as oxides of elain, into which oils are wholly con-

vertible; and, finally, by the action of time, air, and heat, they approach an elementary state, suffer incipient combustion, develope hydrogen, and become ultimately carbonized and darkened: in all which states, oils are deteriorated for working freely and for painting with pureness and permanence, as the fat oils are for burning in lamps.

All oils are soluble or miscible in water by the medium of alkalis, absorbent earths, or other metallic oxides, and are, therefore, capable of chemical union with pigments; they are partially soluble also in alcohol, and absorb or take up by agitation small portions of both alcohol and water, which they resign upon being heated.

295. LINSEED OIL.

Of the expressed or drying oils appropriate to painting, "*Honest Linseed*" is by far the strongest, and that which dries best, most tenaciously, and firmest under proper management; which properties it owes to its being at once resinous, glutinous, and oleaginous. Having more of the quality of a resin than a fat oil, it never totally loses its transparency while liquid, in the manner of fat oils by cold, but preserves it during the most intense frost in the manner of a resin; and like the resins also, it becomes ultimately fixed, hard, and solid, by combining with the oxygen of the atmosphere: but it lies under the great disadvantage of acquiring, after drying, and by exclusion from light and pure air, a semi-opaque and yellow-brown colour, which darkens by age. To obviate this as much as possible, when painting with oil alone, it is best to work the colour as stiff as may be, so as to use as small a portion of the vehicle

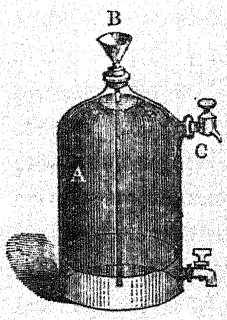
as may suffice; for it is a fact proved by direct and repeated experiments, that *little oil diffused through much colour is subject to little change* upon the canvass, and that a thin coating of linseed oil is similarly preserved by light and the action of the atmosphere.

297. Linseed oil varies in quality according to the goodness of the seed from which it is expressed; the best is yellow, transparent, comparatively sweet-scented, and has a flavour somewhat resembling that of the cucumber: great consequence has been attributed to the cold-drawing of this oil, but it is of little or no importance in painting whether moderate heat be employed or not in expressing it. Several methods have been contrived for bleaching and purifying this oil, so as to render it perfectly colourless and limpid; but these give it mere beauty to the eye in a liquid state, without communicating any permanent advantage, since there is not any known process for preventing the discolourment we have spoken of as sequent to its drying: and it is, perhaps, better upon the whole that this and every vehicle should possess that colour at the time of using to which it subsequently tends, that the artist may depend upon the continuance of his tints, and use his vehicle accordingly, than that he should be betrayed, by a meretricious and evanescent beauty in his vehicle, to use it too freely. Linseed oil that has been long boiled upon litharge in a water-bath, to preserve it from burning, acquires colour; and is, when diluted with oil of turpentine, less disposed to run than pure linseed oil, and affords one of the most eligible vehicles of the oil painter.

298. The most valuable qualities of linseed oil, as a

vehicle, consist in its great strength and flexibility; some have preferred it when bleached by exposure to sun and air; others, when *new and fresh*, or that which is *cold-drawn*; but that is the best which will temper most colour in painting; and oil expressed with a heat, which does not char or much discolour it, is equal in all respects to the cold-drawn.

299. To purify and preserve a stock of any kind of oil in its limpid state, and prevent its forming stearine, or gluten, or resin, according to its kind, it is requisite to keep it upon water, excluded from air. A simple oil apparatus for this purpose is represented in the annexed figure; in which A is a glass or tin vessel of any required size, having some water at the bottom; B is a small funnel, with a pipe passing through a cork down to the water, and C a small cock, formed without any external tube, to prevent the concrescence of the oil therein; by which means the artist may obtain as much oil as he may require, by a like quantity of water poured into the funnel. Any sediment will sink into the water, which may be removed when the oil is exhausted; or may be drawn off by the lower cock and replaced by fresh water run into the funnel.



300. THE DRYING OF OILS.

Appears to depend on the following conditions:—the presence of oxygen which by an incipient combustion of the hydrogenous oils fixes them, whence whatever contributes

oxygen to oil dries it, as it is the case with pure air, sunshine, &c. Hence all the perfect oxydes of metals including even pure earths and alkalis in due proportions, dry oils. Hence imperfect oxydes, by abstracting oxygen from oil retards drying, hydrogenous substances are hence ill dryers in oil, hence the best dryers are those which contain oxygen in excess; and such are litharge, sugar of lead, minium, massicot manganese, umbers, sulphate of zinc or white copperas, and verdigris.

301. PALE DRYING OIL.

The oil should be macerated, two or three days at least, upon about an eighth of its weight of litharge, in a warm place, occasionally shaking the mixture, after which it should be left to settle and clear; or it may be prepared without heat by levigating the litharge in the oil. Acetate of lead may be substituted for litharge, being soluble with less heat, and its acid being volatile escapes during solution and bleaches the oil; to which coarse smalt may be added to clear it by subsidence, increase its drying, and neutralize its brown colour. This affords *pale drying oil* for light and bright colours, which may be preserved for use in the above-described apparatus.

302. BOILED OIL.

The above mixture of oil and litharge, gently and carefully boiled in an open vessel till it thicken, becomes *strong drying oil* for dark colours. Boiled oil is sometimes set on fire purposely in the making of *Printers' Varnish and Printing Ink*, and also for painting and the preparation of JAPANNERS' GOLD SIZE. As dark and transparent colours

are in general comparatively ill driers, *japanners' gold size* is sometimes employed as a powerful means of drying them. This material is very variously and fancifully prepared, often with needless, if not pernicious ingredients; but may be simply, and to every useful purpose in painting, prepared as follows:—Powder finely of asphaltum, litharge or red lead, and burnt umber, or manganese, each one ounce; stir them into a pint of linseed oil, and simmer the mixture over a gentle fire, or on a sand-bath, till solution has taken place, scum ceases to rise, and the fluid thickens on cooling; carefully guarding it from taking fire. If the oil employed be at all acid or rancid, talc, powdered, or a small portion of chalk or magnesia, may be usefully added, and will assist the rising of the scum and the clearing of the oil, by its subsidence; and if it be kept at rest in a warm place, it will clear itself: or it may be strained through cloth and diluted with turpentine for use. *Gold size* for gilding is commonly made of boiled oil and fine Oxford ochre.

303. POPPY OIL

Is much celebrated in some old books under the appellations of *oil of pinks* and *oil of carnations*, as erroneously translated from the French *œillet*, or *olivet*, a local name for the poppy in districts where its oil is employed as a substitute for that of the *olive*. It is, however, inferior in strength, tenacity, and drying, to linseed oil, although next to it in these respects; and, though it is of a paler colour, and slower in changing, it becomes ultimately not so yellow, but nearly as brown and dusky as linseed oil, and, therefore, is not to be preferred to it. Boiled as above, it is the *Oglio Cotto*, or the *baked oil* of the Italians.

304. NUT OILS

Resemble poppy oil in painting, but with inferior powers; and the *fish oils*, of the *seal*, and *cod*, though sometimes used with dryers in the coarser painting, are inferior in qualities to them all, and little better than *tar* similarly employed.

305. MAGILP.

Or *English Varnish, &c.* Half a century ago, the gellied vehicles which receive the cant appellations of *magilp* and *gumtian* where the favourite nostrums of the initiated painter, and have maintained a preference with many artists to this day. These compounds of one part or more of strong mastic varnish with two of linseed or other oils rendered drying as above and coagulable by the salts and oxides of lead, were, according to the preceding intentions, improvements upon the simple oil vehicle used on impenetrable grounds, by diluting it, and giving it a gelatinous texture, which enable it, while flowing freely from the pencil, to keep its place in painting, glazing, graining, &c.

306. GUMTION,

Composed of not more than an eighth of the acetate or sugar of lead, with simple oil and strong varnish, which is subject to less change ultimately, particularly when the varnish abounds in the compound. In the using of sugar of lead, if the acid abound, which it does usually in the purer and more crystalline kinds, its power of drying is weakened, and it may have some injurious action upon

colours, such as those of ultramarine and lakes. In this case a small addition of some of the pure oxides of lead, such as litharge, ground fine, will increase the drying property of the sugar of lead, and correct its injurious tendency. A similar composition of ground litharge rubbed with twice its quantity of nut or linseed oil, and a sixth of bees-wax and used with mastic varnish, is called *Italian varnish.*

307. COPAIBA

Is a natural balsam of West Indian production in a liquid state, in which it may be employed both as a vehicle and a varnish; it being of tolerable strength in either use, and preserving its naturally pale colour, but it is entirely needless in common painting.

308. VOLATILE OILS,

Procured by distillation from *turpentine,* and other vegetal substances, are almost destitute of the strength of the expressed oils, having hardly more cementing power in painting than water alone, and are principally useful as solvents, and media of resinous and other substances introduced into vehicles and varnishes. In drying they partly evaporate, and partly by combination with oxygen form resins, and become fixed. They are not, however, liable to change colour like expressed oils of a drying nature; and, owing to their extreme fluidness, are useful diluents of the latter: they have also a bleaching quality, whereby they, in some degree, correct the tendency of drying and expressed oils to discolourment. Of essential oils, the most volatile, and

nearest in this respect to alcohol is the oil of *sassafras*, but that most used in painting is the

309. OIL OF TURPENTINE,

The rectified oil, improperly called *spirit of turpentine*, &c., is preferable only on account of its being thinner, and more free from resin. By the action of oxygen upon it, water is either generated or set free, and the oil becomes thickened, but is again rendered limpid by a boiling heat upon water, in which the oxygen and resin are separated from it. When coloured by heat or otherwise, oil of turpentine may be bleached by agitating some lime powder in it, which will carry down the colour. The great use of this oil under the cant name of *turps*, is to thin oil paints, and in the larger use thereof to *flatten* white and other colours, and to remove superfluous colour in *graining*. It however weakens paint in proportion as it prevents its bearing out, and when used entirely alone it will not fix the paint.

310. OIL OF LAVENDER

Is of two kinds, the fine-scented English oil, and the cheaper foreign oil, called *oil of spike;* these are rather more volatile and more powerful solvents than the oil of turpentine, which render them preferable in enamel painting, of which they are the proper vehicles; they have otherwise no advantage over the latter oil, unless they be fancied for their perfume. The other essential oils, such as oil of rosemary, thyme, &c., are very numerous; but it has not appeared that they possess any property that gives them superiority in painting over that of turpentine: some of them have,

however, more power in dissolving resins in the making of varnishes, as is the case also with naphtha or petroleum, and the rectified oil of coal tar.

311. NAPHTHA,

And the *Coal Oil* of our gas-works, are even more powerful solvents than the vegetal essential oils: but, on this account, and the usual bad scent of the latter, they are less eligible for the painter's use as vehicles: the rectified coal oil may however be deprived of its nauseous smell, by agitating it during several days with dilute sulphuric acid, and subsequently washing the oil with a little powder, or milk of lime.

312. SPIRIT OF WINE,

Or *Alcohol*, is weaker and more dilute than essential oils, or even than water, and is so volatile as to be of use in vehicles only as a medium for combining oils with resins, &c.—as a powerful solvent in the formation of spirit varnishes, and in some degree as an innocent promoter of drying in oils and colours. It affords also powerful means of removing varnishes, &c.

Chapter XXIII.

ON VARNISHES, &c.

313. The last operation of painting is *varnishing*, which completes the intention of the vehicle, by causing the design and colouring to bear out with their fullest freshness, force and keeping; supplies, as it were, natural moisture, and a transparent atmosphere to the whole, while it forms a glazing which secures the work from injury and decay. It is especially necessary for graining and often in ornamental and fancy works of the art.

Varnishes are prepared from an immense variety of substances, of which the *resins*, improperly called gums, afford the best, and those principally used, and a vast number of preparations thereof, uselessly compounded of many ingredients, and little to be depended on, are recorded in different works wherein as usual the simplest are the best. Varnishes are best classed according to their solvents as water-varnishes, spirit varnishes, essential oil varnishes, and oil varnishes, but more usually distinguished according to the substances from which they are prepared.

314. RESINOUS VARNISHES

Are either *spirit varnishes, volatile oil varnishes, fixed oil varnishes, natural balsams,* or compounds of these, their usual solvents being either spirit of wine or alcohol, oil of turpentine, or linseed oil.

The principal varnishes hitherto introduced and to be preferred in painting, are the following.

315. MASTIC VARNISH.

It is true that other soft resins are sometimes substituted for that of mastic, and that very elaborate compounds of them have been recommended and celebrated, but none that possess any evident advantage over the simple solution of mastic in rectified oil of turpentine. Some have used a varnish of *Damas* or *common white resin* mixed with *naphtha*. Others have employed *mastic* and *sandarach* dissolved in *nut, poppy,* or *linseed oils,* and this is evident from the difficulty of removing varnishes from very old pictures. Mastic varnish is easily prepared, by digesting in a bottle during a few hours, in a warm place, one part of the dry picked resin with three or four of the oil of turpentine. A sufficient quantity of this, cleared, varnish to gelatinize or set up either of the before-mentioned drying oils of linseed, constitutes the transparent *magilp* of the painter, &c. If, instead of drying oil, the simple pure linseed oil be used with about an eighth of acetate or sugar of lead dissolved in water, or ground fine, we obtain variously the opaque mixture caled *gumtion.*

316. COPAL VARNISH.

As other soft resins are sometimes substituted for mastic, so inferior hard resins are sometimes employed in the place of copal in the composition of varnishes celebrated as copal varnishes. Copal is of difficult solution in turpentine and linseed oils, both of which enter into the composition of the ordinary copal varnishes, which are employed as var-

nishes by the coach painter, and herald painter, and afford the best varnishes used by the house painter and grainer. Combined, however, with linseed oil and oil of turpentine, copal varnish affords a vehicle superior in texture, strength, and durability to mastic and its magilp, though in its application it is a less attractive instrument, and of more difficult management. As copal swells while dissolving, so its solutions and varnish contract, and consequently crack in drying, and thence linseed oil is essential to prevent its cracking. The mixture of copal varnish and linseed oil is best effected by the medium of oil of turpentine, and for this purpose heat is sometimes requisite: strong copal varnish and oil of turpentine in equal portions with one-sixth of drying oil mixed together, hot, afford a good painter's vehicle: and if about an eighth of pure bees'-wax be melted into it, it will enable the vehicle to keep its place in the manner of magilp. Elemi, Anime and resins of inferior hardness are sometimes substituted for copal in preparing its varnish.

317. WHITE LAC VARNISH

Is a new varnish introduced by ourself, prepared by dissolving in alcohol or spirit of wine, the lac resin of India deprived chemically of all colouring matter, and purified from gluten, wax, and other extraneous substances with which it is naturally combined; without which process the varnish it affords is opaque and of the dark colours of the japans and lacquers of the East, but when thus purified, its varnish is brilliant, transparent, very hard, and nearly

colourless. This varnish being a spirit varnish, requires a warm temperature, which is useful in all varnishing and it dries rapidly. Its place is usually supplied by the *light hard varnish* of the shops, in which softer resins are used with shell lac.

318. LAC

Is of three principal kinds, namely, *Stick-lac*, *Seed-lac*, and *Shell-lac*, of dark or light amber colours, of which the last is the purest, and that of palest colour is the best for varnishes. They are all soluble in pure spirit of wine. Various compositions of *Lac* with less than a fourth of mastic or sandarach, all dissolved, without fire, in spirit of wine, afford the *French Polishes*, which are applied to cabinet work by a roll of woollen list or cloth wound tight, the face of which being dipped into the varnish and covered with a fine linen rag, having a drop only of linseed oil on the centre, is used circularly as a rubber for the varnishing and polishing the plain surfaces of the work by an easy and efficacious process, the carvings and mouldings which the rubber cannot reach, being to be varnished with the brush. The dipping of the rubber, and supplying the drop of oil, are to be repeated alternately as the work goes on, as required till the whole is completed.

319. COWDIE,

Or *Fossil Varnish*. A new resin which exudes naturally from the *Cowdie Pine* of New Zealand and Australia into the soil at the foot of the trees, from which being dug it

has obtained the improper name of *Fossil Gum*, under which it has been imported, and being a fine, transparent *resin* nearly of the hardness of copal, and of similar habits, may become a valuable substitute for the hard varnishes in decorative painting and fine art. But it has hitherto been rejected by manufacturers of varnishes, first from the want of success in forming permanent solution, owing to its precipitating from the solvents after being dissolved, and secondly from the danger of ebulition, inflammation, and explosion of gas evolved during its solution.

320. This latter defect arises from the water absorbed by the resin in its growth, or in the earth, which renders it opaque, but from which it may be freed by grossly powdering and drying, when the resin becomes transparent as glass, and may be melted and dissolved with the safety of other resins—and the first-named difficulty we have effectually remedied by the following simple formula, which yields a strong varnish that dries readily and with a fine surface.

321. Take of broken and dried *Cowdie Resin* one part, melt it in the ordinary vessel, with the usual caution, and stir well and gradually into it, over a fire sufficient to boil without burning it, four parts or more of hot oil of turpentine till the solution is completed, finally stir it well and keep it hot off the fire one hour to clear. In this way, strictly followed, the cowdie or fosil resin will afford an excellent varnish applicable to the purposes of the usual copal varnishes, and superior to that of mastic varnish for pictures in not cracking like copal, and being more

permanent than mastic and as easily and safely removed when requisite: but it does not magilp with drying oil, although it may be mixed and employed therewith.

322. We are of opinion also that, from the abundance, cheapness, and excellence of this resin, it is especially applicable to the purposes of civil, military, and naval architecture, in whatever works a varnish may be required or can be usefully employed, to which the difficulty and danger of permanent solution have been hitherto the obstacles with manufacturers of varnishes accustomed to the old *resins* of elemi, copal, sandarach, &c., improperly called *gums;* but which objections are entirely remedied by the preceding formula. And it is, we presume, for the uses here suggested that the American merchants have become great purchasers of the cowdie resin.

323. GENERAL REMARKS.

Upon comparing the qualities of the varnishes of mastic, cowdie, copal, and lac, it will appear that the latter are successively harder and more perfect as varnishes, and in proportion to their perfection as *varnishes* is the difficulty of using them as *vehicles;* and as it is necessary that before varnishing with any of them the picture should be thoroughly dry, to prevent subsequent cracking, this is perhaps more essential for the latter than for the former. Notwithstanding this necessity, there is one highly important advantage which seems to attend early varnishing; namely, that of preserving the colour of the vehicle used from changing, which it is observed to do when a permanent varnish is

passed over colours and tints newly laid; but this it does always at the hazard, and often at the expense, of cracking, and early varnishing with soft varnish dries slowly and is more disposed to bloom.

324. This saving grace of early varnishing appears to arise from the circumstance that, while linseed and other oils are in progress of drying, they attract oxygen, by the power of which they entirely lose their colour; but, after becoming dry, they progressively acquire colour. It is at the mediate period between oils thus losing and acquiring colour, which commences previously to the oil becoming perfectly dry, that varnish preserves the colour of the vehicle, probably by preventing its farther drying and oxidation which latter may in the end amount to that degree which constitutes combustion and produces colour:—indeed it is an established fact, that oils attract oxygen so powerfully as in many cases to have produced spontaneous combustions and destructive fires.

325. It is eminently conducive to good varnishing, in all cases, that it should be performed in fair weather, whatever varnish may be employed; and that a current of cold or damp air, which chills and blooms them, should be avoided. To escape the perplexities of varnishing, some have rejected it altogether, contenting themselves with oiling-out,—a practice which, by avoiding an extreme, runs to its opposite, and subjects the work to ultimate irrecoverable dulness and obscurity.

326. The manufacturing processes for the varnishes now generally used have been detailed in the *Transactions*

of the Society of Arts, &c., Vol. XLIX. But with regard to the recipes for compounding varnishes, &c., superabounding in ancient and modern treatises, however flatteringly recommended, there are few eligible and yet fewer justifiable to art and good chemistry by the simplicity upon which certainty of effect depends, being in general quite of the class of the recipes and formulæ of the old cookery-books and dispensatories.

327. Presuming the decorator and painter to have acquainted himself with the principles of colours, &c., so as to apply them with taste and effect, as well as with a due knowledge of his materials, both of which are indispensable, there will yet remain to the complete mastery of his art the various modes and operations of painting, &c., in which they are to be applied, but for which he must rely upon his acquirement of skill and practice. These, therefore, we proceed finally to describe with such observations and additions as may appear expedient.

Chapter XXIV.

MODES AND OPERATIONS OF PAINTING.

328. GROUNDS

Are of first consideration to the artist in every mode of painting, a well-prepared surface being an essential basis for the work, whether it be on wood, canvas, paper, plaster, stucco, stone, or metal; on all which it is necessary to

produce a clean and even face by the application of pumice-stone, scraping, filing, &c., to remove roughnesses, and to stop and putty cracks and hollows, and to prime and prepare according to the nature of the work and the ground itself.

329. PAINTING IN OIL

On wood requires first the smoothing, cleaning and dusting of the surface. What is technically called *killing of the knots* consists in applying wet lime over them, which when dry should be rubbed with a hot iron to melt out resin or turpentine that might flow and disturb the paint; they may then be pumiced and made smooth. Holes and cracks must be stopped with PUTTY, which is made by kneading, whitening or powdered chalk into a tenaceous mass with boiled linseed oil, which dries hard as stone. Puttying is best performed after the oil painting, or first coat of paint, which secures its adhesion.

330. PRIMING,

For works that are to stand damp and weather, consists in a first thin painting with linseed oil and red-lead, massicot, or litharge; but for in-door and dry work *clear-colling* is preferred, which consists in using *size* of glue instead of oil in the priming, but it is liable to peel and scale off in damp places. Work thus prepared, smoothed, and primed, is ready for the painting and finishing; but in no case should wood in a wet state, or green and unseasoned wood, be painted in oil; the consequence in such cases being

either the speedy decaying of the wood, or the scaling and casting off of the paint. The usual process of oil-painting requires the ground white lead to be diluted with linseed oil and hardly any spirit of turpentine for the first coat; equal quantities of both for the second coat, and for the third or finishing coat twice as much turpentine as linseed oil; and still more of the turpentine in proportion for dead flatting according to the tints and colours. For work exposed to weather the turpentine should be wholly omitted, and oil alone employed. When painting external work in imitation of free-stone it is a valuable practice to strew the second or last full coat of oil paint while wet with fine washed and sifted sand, which adhering and drying on with the paint, forms a durable coat, exactly resembling stone and protecting the work from weather. Powdered talc, gold and silver leaf, bronzes, smalts and colours, are similarly employed in ornamental works.

331. FLATTING

Consists in employing spirit of turpentine instead of linseed oil in diluting of the colour so that no more oil is used than is necessary to bind the paint and fix it on the ground, and not sufficient to make it bear out with the gloss of ordinary oil painting; a third or fourth of the oil being sufficient. This mode is of course only suited to internal and delicate works in which the change of colour and glare of light are to be avoided, and it might in some cases appear to advantage mixed and comparted with ordinary painting, diversified by dead colour and gloss; or the latter may be produced by varnish.

332. The priming under the same conditions is the same for wood, plaister, stucco, and stone; but for paper and canvas, which are made rotten by oil, the priming must be of size, and for iron work, first freed from rust, it must in all cases be of oil, avoiding the use of copper greens as a first coat. For small works, primed canvas may be obtained from the colourmen. Dryers are requisite in priming as they dispose the upper painting to dry quicker and unite better. Sponging with water previous to the applying each coat of paint disposes it to work and unite better, and in work exposed to the sun prevents blistering.

333. GRAINING

Is the imitation of the natural grain of woods, marbles, tortoiseshell, &c., and is performed in the first case by laying an opaque ground in strong oil-paint of the general colour of the wood to be imitated, but lighter, and when dry going over it with a coat of transparent colour of the proper hue and full depth of the grain prepared either with turpentine or water colour. These operations are performed with common brushes, and as soon as the latter coat is dry, the graining is executed by a variety of tools consisting of broad, flat, and thin brushes, used either spread, turning the hand, or edgewise; hair pencils of various sizes, combs, pallette knives, and rubbers, which being as occasions requires, dipt into turpentine, or water when water-colour has been used, are passed quickly and lightly over the paint so as to leave the streaks, grains, and knots intended to remain, untouched, according to the skill and fancy of the

painter, when it is immediately wiped off judiciously with a rag which takes up the upper coat of the paint where dissolved by the turpentine or water, leaving the graining as required and exhibiting the ground between. The finishing operation consists in varnishing only, which may be done with varnish of Copal, Anime, the Cowdie varnish described (No. 319), or Mastic, according to the work, observing that the strongest oil varnish is best for external work, and in some cases boiled oil alone.

Of course the skill and practice of the grainer are principal in these operations, which are so admirably performed by many, as to imply a degree of taste, observation, and dexterity of hand that places this art in rank above common painting. The art is modern—was invented and perfected in this country, where the best workmen are to be found, who have been indebted for their art to the progress and practice of colouring in the higher branch of landscape painting, in which our artists are equally pre-eminent in water and oil, both of which enter with solid painting and glazing, into the practice of graining.

334. MARBLING

Is executed by a like process in a broader manner, and dexterous wiping out; and where streaks are required whiter than the general colour of the stone or marble to be imitated, or of various colours, they are to be added with solid paint and pencil in the first case, or with transparent colours in the latter. In particular imitations, as of Lapis Lazuli, metallic particles and graining sare to be given with

leaf-gold, Dutch leaf, or bronzes. The final operation is varnishing as above directed.

335. STAIN-GRAINING.

In addition to the art of imitating the graining of woods, marbles, &c., by oil-colours, there are methods of bringing out with effect and beauty, as well as of preserving the natural graining of woods, &c., and also of imitating, heightening, and improving them artificially, which though less practised, is not less ingenious or worthy of attention from the grainer, it being as desirable to heighten and preserve the natural beauty of wood-works, as by artificial painting to imitate them or hide their defects.

336. For bringing out the natural grain of wood-work where it is of sufficient beauty, it is enough to apply successive coats of drying oil, or to varnish the naked work till it bears out, which is sufficient for ordinary joiner's work; but in the nicer cabinet work, in which the choice ornamental woods are employed, French polishing is necessary, which is performed with a spirit varnish containing Lac, applied by rubbers with linseed oil, as before described [318] and is now so common as to have become a distinct business.

337. In other cases graining may be performed on the naked wood with transparent colours in turpentine or water, which when dry may be varnished or French polished, or the same may be done on the ordinary woods previously stained of the colours of the more valuable sorts.

Or a beautiful variety of graining may be executed with

strong acids on plain wood, brought out by heat; in which way the nitrous acids or aqua-fortis applied affords amber and yellow shades, and the sulphuric acid or spirit of vitriol, yields shades of a darker and dusky hue, so as together to imitate the various hues of tortoiseshell, &c.; after which the work is to be cleaned off, and varnished or polished.

338. TRANSPARENCIES

Are usually painted on white linen cloth, or cotton, stretched even and tight on a flat frame. It is then either first varnished, prepared with bee's-wax dissolved in turpentine, or sized according to the occasion; on either of which any of the transparent pigments ground in turpentine, or oil colours, may be applied with diluted varnish in execution of the design. See Table VII.

339. SMELL OF PAINTS.

Painting is perhaps of as little inconvenience as any other mechanical operation carried on in an inhabited house; and of even less except from the scent of its oils, which is stronger the quicker they dry, but the sooner it goes off. The best remedies are fire in the rooms, and a free circulation of air in fine weather. The using of aromatics only increases the evil. It is important also in this respect, that all paint-pots, oil-cans, brushes, cloths, and tools imbued with paint, should be removed as soon as possible, and the floors, &c., washed clean, which will at once remove the greater part of the ill-scents and promote the drying of the work. Nor can we too earnestly

recommend to the painter thorough *cleanliness* of person and operation, as most essential to his own health and the well-doing of his work, and as a principal mark of the ablest and most respectable workman.

The employment of disinfecting fumes of acids, chlorine, &c., can only remove a disagreeable by one more so, and do mischief by injuring some colours, and rather retard than promote drying, after which the ill-scent of paint ceases.

340. INODOROUS PAINTING.

Attempts have been made to execute ordinary painting with a vehicle which should have the qualities of drying oils without their powerful scents, and we have already adverted to uses of borax in this respect [280]. For such purpose dissolve one part of borax in twelve parts of boiling water. With this solution the usual spirit varnishes, or other varnishes, or even oils may be mixed, and form a liquid that may be applied with the usual pigments of the oil painter, and diluted as required with water; and whatever work is painted therewith resists moisture when dry, and may then be washed nearly in the manner of oil-painting.

341. ANOTHER MODE.

In which we long since succeeded in forming a vehicle of similar character, was by abstracting the acid of alum without wholly precipitating its earth; first dissolving any requisite quantity of alum in four times as much boiling

water, and then stirring slowly in fine cream of slacked lime till the mixture became thickened by the precipitation of alumine: sufficient pyroligneous acid or vinegar was then added to re-dissolve the alumine, and the sulphate of lime suffered to subside.

342. This *Sulphate of Lime* is of a fine white colour, and may be employed with the liquid, instead of the white lead of the oil painter, as a basis in this kind of painting; or fine prepared plaster of Paris, which is a sulphate of lime, or the constant white of the artists, which is a sulphate of barytes may supply its place, and be employed in producing tints with most of the painter's colours in the above liquid, to which some fresh size may be added, and the paints thus produced applied in the manner of painting in distemper. By this vehicle the more delicate colours are rather improved than injured; and after it becomes dry it resists moisture, and a coat of it over painting so fixes it that it may be washed in the manner of that of borax, both of which may be employed in rendering cloth, paper, &c., waterproof.

343. RULES OF PAINTING.

The following *General Rules* may be followed with advantage in painting:—1. Let the ground of your work be properly cleaned, prepared, and dry. 2. See that your colours are equally well ground and duly mixed. 3. Do not mix much more, nor any less paint than is necessary for the present work. 4. Keep the paint well mixed while the work is going on. 5. Have your paint of due thickness,

and lay it on equally and evenly. 6. Do not apply a succeeding coat of paint before the previous one is sufficiently dry. 7. Do not employ a lighter colour over a darker. 8. Do not add dryers to colours long before they are used. 9. Avoid using any excess of dryer, or a mixture of different sorts. 10. Do not overcharge your brush with paint, nor replenish it before it is sufficiently exhausted. 11. Begin with the highest parts and proceed downwards with your work. 12. Do your work to the best of your ability, honestly, for such you will find the best policy.

344. FRESCO.

The art of painting in fresco is naturally adapted to decorative painting, and the zealous attention of eminent artists being at present turned to the revival of this great and free mode of art, we will not withhold our observations thereon.

It is hardly necessary to inform the reader, that *fresco painting* is performed with pigments prepared in water, and applied upon the surface of *fresh laid plaster* of lime and sand, with which walls are covered; and as it is that mode of painting which is least removed in practice from modelling or sculpture, it might not improperly be called *plastic painting;* for which the best lime, perfectly burnt and kept long slacked in a wet state is most essential. And as lime, in an active state, is the common cementing material of the ground and colours employed in fresco, it is obvious that such colours or pigments only can be used therein as remain unchanged by lime. This need not, however, be a universal

rule for painting in fresco, since other cementing materials, as strong or stronger than lime, may be employed, which have not the action of lime upon colours—such is calcined gypsum, of which plaster of Paris is a species; which, being neutral sulphates of lime, exceedingly unchangeable, have little or no chemical action upon colours, and would admit even Prussian blue, vegetal lakes, and the most tender colours to be employed thereon, so as greatly to extend the sphere of colouring in fresco, adapted to its various design; which basis merit also the attention of the painter in crayons, scagliola, and distemper.

345. So far too as regards durability and strength of the ground, the compo and cements now so generally employed in architectural modellings, stucco and plaster would afford a new and advantageous ground for painting in fresco; and as it resists damp and moisture, it is well adapted, with colours properly chosen, to situations in which paintings, executed in other modes of the art, or even in ordinary fresco, would not long endure.

As these materials, and others now in use, were either unknown or unemployed by the ancient painters in fresco, their practice was necessarily limited to the pigments enumerated in the preceding Table IX.; but every art demands such a variation in practice as adapts it to circumstances and the age in which it is exercised, without attention to which it may degenerate, or, at best, remain stationary, but cannot advance.

Although differing exceedingly in their mechanical execution, the modes of fresco, distemper, and scagliola agree

in their chemical relations, so far, therefore, as respects colours and pigments the foregoing remarks apply to these latter arts.

346. IN DISTEMPER PAINTING,

However, the carbonate of lime, or whitening employed as a basis, is less active than the pure lime of fresco. The vehicles of both modes are the same, and their practice is often combined in the same work: water is their common vehicle; and to give adhesion to the tints and colours in distemper painting, and make them keep their place, they are variously mixed with the size of glue (prepared commonly by dissolving about four ounces of glue in a gallon of water). Too much of the glue disposes the painting to crack and peel from the ground; while, with too little, it is friable and deficient of strength. In some cases the glue may be abated, or altogether dispensed with, by employing plaster of Paris sufficiently diluted and worked into the colours; by which they will acquire the consistency and appearance of oil paints, without destroying their limpidness, or allowing the colours to separate, while they wil acquire a good surface, and keep their place in the dry with the strength of fresco and without being liable to mildew—to which animal glue is disposed, and to which milk, and other vehicles recommended in this mode, are also subject.

Of more difficult introduction in these modes of painting is *bee's-wax*, although it has been employed successfully in each of them, and in the encaustic of the ancients, who finished their work therein by heating the surface of the painting till the wax melted.

347. SCAGLIOLA,

Which requires all the attentions of the fresco painter in respect to the materials employed, and the skill of the grainer in imitating marbles, comes nearer to the Plasterer's than the Painter's Art, although the Decorator is best qualified for its performance. Its basis is plaster of Paris mixed with the colours of fresco, laid on a solid ground of plaster or cement, acording to the design, and, when dry and hard, it is polished.

Appendix.

348. CLEANING AND RESTORING.

Of the importance of this minor function of the art of painting, a just estimate may be formed by considering that there is hardly a limit to the time works in oil-painting may be preserved by care and attention. These are subject to deterioration and disfigurement simply by dirt—by the failure of their grounds,—by the obscuration and discolourment of vehicles and varnishes,—by the fading and changing of colours,—by the cracking of the body and surface,—by damp, mildew, and foul air,—and by mechanical violence. The first thing necessary to be done is to restore the ground, if on canvas, by stretching or lining with new canvas. In cases of simple dirt, washing with a sponge or soft leather with soap and water, judiciously used, is sufficient. Varnishes are removed by friction or solution, or by chemical and mechanical means united when the varnish is combined, as commonly happens, with oil and a variety of foulness.

349. IN REMOVING VARNISH

By friction, if it be a soft varnish, such as that of mastic, the simple rubbing of the finger-ends, with or without water, may be found sufficient; a portion of the resin attaches itself to the fingers, and by continued rubbing

removes the varnish. If it be a hard varnish, such as that of copal, which is to be removed, friction with sea or river-sand, the particles of which have a rotundity that prevents their scratching, will accomplish the purpose.

The solvents commonly employed for this purpose are the several alkalies, alcohol, and essential oils, used simply or combined. Of the alkalies, the volatile in its mildest state, or carbonate of ammonia, is the only one which can be safely used in removing dirt, oil, and varnish, from a picture, which it does powerfully; it must, therefore, be much diluted with water, according to the power required and employed with judgment and caution, stopping its action on the painting at the proper time by the use of pure water and a sponge.

Many other methods of cleaning have been recommended and employed, and in particular instances, for sufficient chemical reasons, with success; some of which we will recount, because, in art so uncertain, it is good to be rich in resources.

A thick coat of *wet fuller's earth* may be employed with safety, and, after remaining on the paint a sufficient time to soften the extraneous surface, may be removed by washing, and leave the picture pure,—and an architect of the author's acquaintance has succeeded in a similar way in restoring both paintings and gilding to their original beauty by coating them with wet clay. Ox-gall is even more efficacious than soap.

350. In filling cracks and replacing portions of the ground, putty formed of white-lead, whitening, varnish, and

drying oil, tinted somewhat lighter that the local colours require, may be employed; as plaster of Paris may also in some cases; and, in restoring colours accidentally removed, it should be done with a vehicle of simple varnish, because of the change of tint which takes place after drying in oil.

301. REMOVING PAINT,

Burning, &c. In those cases in which it is requisite to remove painting entirely from its ground, and it is usual to resort to mechanical scraping &c., or to the very dangerous operation of setting fire to the painted surface immediately after washing it over with oil of turpentine, called *turps*, for burning off the paint from old disfigured work; an operation that may be safely and more easily accomplished by laying on a thick wash or plaster of fresh slacked quicklime mixed with soda, which may be washed off with water the following day, carrying with it the paint, grease, and other foulness, so that when clear and dry, the painting may be renewed as on fresh work. Clear-colling is sometimes resorted to over old painting, for the purpose of re-painting, in which case the surface exposed to the sun's rays or alterations of temperature is liable to become blistered and scale off.

CONCLUSION.

352. We might ere concluding have described the variety and uses of tools,—prescribed particular instructions for manual operations, and easy modes of doing difficult things,—"royal roads" to skill and knowledge,—multiplex formulæ, and secrets of art,—all of which are uncalled for by talent and industry, and are already as abundant in print as they are useless in practice. We will not therefore delude the reader by inefficient prescriptions, but refer him for experience to principles—to the example of the skilful, and his own application and ingenuity, neither of which will fail him. Tools are abundant for ordinary uses, and as to the nicer purposes of the art, requiring superior materials and instruments, such are best to be obtained from the artist's colourmen.

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